C0150018 #5830
C0150019

INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

Interwest Mining Company
Huntington Office
P. O. Box 310
15 North Main Street
Huntington, UT 84528

RECEIVED
JAN 18 2019
DIV OF OIL, GAS & MINING

Utah Division of Oil, Gas, and Mining
Coal Program
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-5801

January 18, 2019

Subject: **Amendment to Remove Commitment for Yearly Subsidence Surveys and Report, Clean Copies Submittal, PacifiCorp, Cottonwood Mine, C/015/0019 and Deer Creek Mine, C/015/0018, Emery County Utah Task #5830.**

PacifiCorp, by and through its wholly-owned subsidiary, Interwest Mining Company (as mine manager), hereby submits two (2) clean copies of the above stated amendment, Task ID #5830. The Division informed PacifiCorp by letter dated January 3, 2019 that the amendment had been conditionally approved pending clean copy submittal.

Attached are two clean copies of Task ID 5830. A C2 form is also included to aid in placement in the copies within the MRP. Please return one copy for our own MRP.

Sincerely,

Kenneth S. Fleck

Kenneth S. Fleck
Geology and Environmental Affairs Manager
Interwest Mining Company

Encl

Cc File

APPLICATION FOR COAL PERMIT PROCESSING
Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: PacifiCorp
Mine: Deer Creek Mine **Permit Number:** C/015/0018, 0019
Title: Amendment to mine permits to remove the commitment for yearly subsidence surveys and reports from Mining and Reclamation Plans, PacifiCorp, Cottonwood / Wilberg Mine, C/015/0019, and Deer Creek Mine, C/015/0018, Emery County, Utah.

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
☒ Add	☐ Replace	☐ Remove	Cottonwood Mine Permit Volume 7, Appendix XVI - Addendum to Subsidence Monitoring Plan
☒ Add	☐ Replace	☐ Remove	Deer Creek Mine Permit Volume 3B Appendix X - Addendum to Subsidence Monitoring Plan
☐ Add	☒ Replace	☐ Remove	Deer Creek Permit Volume 11, Geology Section - Replace Entire Section
☐ Add	☒ Replace	☐ Remove	Deer Creek Permit Volume 11, Engineering Section - Replace Entire Section
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.	Received by Oil, Gas & Mining RECEIVED JAN 18 2019 DIV OF OIL, GAS & MINING

Form DOGM - C2 (Revised March 12, 2002)

R645-301-500 ENGINEERING SECTION

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Note: The Deer Creek Mine ceased production in January 2015. The southern portion of the mine was separated (by the construction of the 3rd North cross-cut 138 seals) from the Mill Fork Area and the portals at the Deer Creek Canyon facility. The ventilation portals at the 9th East breakouts were sealed and backfilled in April 2015. The 1st Right Fan was taken off-line in March 2015. The final sealing of the Rilda Canyon Right Fork portals consisted of first constructing a water drainage system inclusive of an in-mine collection gallery together with the construction and permanent placement of a buried water pipeline (10" HDPE pipe) from the Rilda Canyon Right Fork portal to the Huntington Power Plant raw water pond (approximately 6 miles). This pipeline project was completed in November 2017. The final Rilda Canyon portal sealings consisted of two 25-foot thick concrete portal plugs with water drains, one each in the 1st Right facility fan and roadway portals that were constructed on November 8 and 10, 2017, and high strength Strata panel portal seals, one each in the Left Fork facility fan and roadway portals completed on December 18 and December 20, 2017. The portal seals were constructed to meet or exceed regulatory requirements of 30 CFR 75.1711.

All information pertaining to the operations of the mine, coal recovery, mining methods, and subsidence control have been retained for a historic reference.

R645-301-510 INTRODUCTION

The Engineering Section provided within this permit application contains general descriptions, information, and design criteria for both operation and reclamation of the facilities associated with the North Rilda Area and Mill Fork Area mining operations. Most plans, maps and designs for the North Rilda Area operations (Left Fork Fan Facilities) can be found in Volume 2 of the Deer Creek Mining and Reclamation Plan (MRP). A portion of these facilities are detailed below. All plans, maps and designs associated with the Mill Fork Area operations (Rilda Canyon Portal Facilities) are detailed in the following sections. In general, the Left Fork Fan Facilities will be discussed first followed by the Rilda Canyon Portal Facilities.

Coal mining has occurred since 1946 in Deer Creek Canyon, a tributary of Huntington Canyon in Emery County, Utah. Utah Power & Light Company (now PacifiCorp) purchased the operations and coal leases from Peabody Coal Company in 1977. The Deer Creek Mine portal, mine personnel, and its coal handling facilities are located in Deer Creek Canyon.

Mining in the North Rilda Area produced coal from both the Blind Canyon and Hiawatha coal seams. Approximately 23 million tons of minable coal was mined from the North Rilda Area during the past few years. A portion of the North Rilda Area will be used to provide access from the Rilda portals to the Mill Fork Lease area. Refer to Volume 5, Plates 3-6, Life of Mine Plan / 5 Year Increments - Blind Canyon Seam, and 3-7, Life of Mine Plan / 5 Year Increments - Hiawatha Seam.

Because of the need to expand the mining operations to the northwest (Mill Fork State Lease #48258), surface facilities are required in Rilda Canyon. This includes construction of the mine entries, facilities pad, fan, ancillary facilities, sediment control structures, and soil storage piles.

No coal processing or coal transportation facilities will be utilized at these facilities. All mined coal from the extended Deer Creek Mine will continue to be transported through the Deer Creek Canyon portals and processed at these facilities. The processed coal is then transported via beltline to the Huntington Power Plant. The Huntington Power Plant is owned and operated by PacifiCorp.

A variety of engineering principles and techniques are applied in the Deer Creek Mine operation. Principles of engineering employed are those associated with standard prudent mine engineering practices. More detail about the methodologies used to plan the coal mining activities for long-range goals at the Deer Creek Mine and the use of computer assisted models can be found in Volume 2, Part 3 of the MRP.

R645-301-511 General Requirements

This document includes the general requirements to meet the State of Utah's regulatory requirements to mine coal in the North Rilda Area and operate surface facilities in Rilda Canyon as part of the Deer Creek Mine. The surface facility operation plan includes information or references the existing mine plan when appropriate. The potential impact to the environment is also addressed. As reflected by its format, much of the current Deer Creek MRP was written prior to the State's R645- Rules. This plan attempts to follow the Rules general format, yet allow it to also be consistent with the existing MRP.

Rilda Canyon Portal Facilities and Operations: Early mining operations, prior to PacifiCorp's presence in the canyon, occurred near the surface facilities (see Map 400-1). These operations include the Rominger (Ferrell) Mine, Jeppson Mine, Leroy (Comfort) Mine, and Helco Mine (refer to site photos A through C in Volume 11 Appendix Volume - Engineering: Appendix G). These mines were active during the 1940's and early 1950's. Abandoned Mine Lands (AML) reclaimed these mines in 1988. Much of the the disturbed surface area of the Rilda Canyon facilities occurs west of the Leroy, Rominger, and Jeppson mines disturbed area. However, a portion of the disturbance, namely the sediment pond (Leroy mine site) and topsoil storage (Helco mine site) occurs in these previously disturbed areas.

Surface facilities in Rilda Canyon include the existing mine fan, substation and water supply in the Left Fork of the canyon, and surface related facilities associated with the Rilda Canyon Portal Facilities. These facilities include (but not limited to) access and mine fan portals, exhaust fan, facilities pad, fuel dock, rock dust tank, sediment pond, sediment basin, waste and waste rock storage bins, substation, MCC building, drainage systems, and covered storage buildings. Refer to Section R645-301-521 for a detailed description of all surface facilities of the Rilda Canyon Portal Facilities. Also refer to Volume 12 of the Deer Creek MRP for detailed information of the mining plan, mining production, and mining methods that will be utilized within the Mill Fork Lease.

R645-301-512 Certification

Applicable cross sections and maps have been included or referenced within this document. They have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer, geologist, or land surveyor, with assistance from experts in related fields such as hydrology, geology, and biology.

R645-301-513 Compliance with MSHA Regulations and MSHA Approvals

All structures that are constructed to allow mining in the North Rilda Area and the Mill Fork Lease will comply with all regulations, whether at the local, State, or Federal level.

There are no impoundments or sedimentation ponds that meet size or other qualifying criteria of MSHA, 30 CFR Part 77. All impoundments or sedimentation ponds utilized by operations in Rilda Canyon meet the requirements outlined in the Utah Coal Regulations.

Underground development waste, coal processing waste and excess spoil will continue to be disposed of in accordance with plans approved by DOGM and MSHA. There are no plans to return coal processing wastes to the underground workings at Deer Creek Mine. All coal is shipped via beltline through the Deer Creek Canyon portals.

There are no plans to construct refuse piles within the facilities area in Rilda Canyon. All refuse that is transported through the Rilda Canyon portals is temporarily stored in a refuse bunker. As the bunker fills to capacity, the refuse is transported by truck to the Deer Creek waste rock site in Huntington Canyon for permanent storage.

Each shaft, drift, adit, tunnel, exploratory hole, entryway or other opening to the surface from underground will be capped, sealed, backfilled or otherwise properly managed consistent with MSHA, 30 CFR 75.1771. Refer to Section R645-301-550 Reclamation Design Criteria and Plans below.

PacifiCorp proposes to collect or divert storm water runoff from the mine facilities area (refer to R645-301-521-180 Support Facilities for details). Collected runoff is diverted through a series of ditches and pipes to the sediment basin. As this basin fills to capacity, runoff will over flow and divert to the sediment pond located in the Leroy Mine area. Undisturbed runoff is diverted around or under the facilities through ditches and pipes into the Rilda Creek.

R645-301-514 Inspections

All appropriate engineering inspections and reports will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer during the construction, operation, and reclamation activities of mining.

R645-301-515 Reporting and Emergency Procedures

In the event any potential hazard exists, develops, or occurs in association with slides and/or impoundment structures which may have an adverse effect on the health and safety of the public, property, or the environment, DOGM will be promptly notified. The operator commits to comply with any remedial measures required to protect and ensure the health and safety of the public.

The Deer Creek Mine facility conducts routine inspections on a weekly basis. Should a hazard exist or occur, personnel have been instructed to notify the Mine Manager, who will coordinate and implement any emergency procedures and remedial measures to be taken.

Where temporary cessation of operations is necessary for a period beyond 30 days, the applicant will submit the proper notification and information required of R645-301-515.300 to DOGM.

R645-301-520 OPERATION PLAN

R645-301-521 Introduction

The plan for the mining in the North Rilda Area includes or references maps, cross sections, narratives, descriptions, and calculations indicating how the relevant requirements are met. The plan describes and identifies the lands subject to coal mining and reclamation activities over the estimated life of the operations and describes the size, sequence, and timing of the sub-areas for which it is anticipated that individual permits for mining will be sought. For review of the mining plan of the Mill Fork Lease area, refer to Volume 12, Mill Fork Lease, ML-48258.

R645-301-521.110 Previously Mined Areas

Areas previously mined in the Rilda Area are presented on Map 500-1, Pre-Disturbance Topography, in the Maps Section. These areas include the Leroy Mine, Rominger Mine, Jeppson Mine, and Helco Mine. Mining occurred in these mines in the 1940's and 1950's. Abandoned Mine Lands reclaimed these sites in 1988. Extents of mine workings of the said mines are included on Map 500-1. Photos of all previously mined areas in Rilda Canyon area illustrated in Volume 11 Appendix Volume - Engineering: Appendix G. All openings have been backfilled by AML during reclamation activities.

R645-301-521.122 Man Made Features

Rocky Mountain Power owns and operates a 25 KV electrical power transmission line that supplies electrical power to the Left Fork fan facilities. This line (refer to Map 500-3), prior to construction, was located on the north side of EC#306. This transmission line required relocation to south side of the then proposed Rilda Canyon Portal Facilities. Energy West West (now Interwest Mining Company) coordinated with Rocky Mountain Power to establish a new right of way for the transmission line and completed this relocation activity in May 2005.

Water wells exist in Rilda Canyon near the disturbed area boundary. These wells were developed in 1989 to evaluate the hydrologic characteristics of the alluvium for the North Emery Water Users Special Service District's spring collection system (also adjacent to the disturbed area boundary). The wells were drilled through the alluvium to bedrock. Monthly monitoring (level only) is conducted on the wells. Refer to Map 500-3 for location. Refer to Volume 9 for complete discussion. Refer to photo's D through F in Volume 11 Appendix Volume - Engineering: Appendix G.

R645-301-521.123 Public Road

Emery County Road #306 runs approximately 3.0 miles from the Huntington Canyon road, Highway 31, to the turnaround area in the Left Fork of Rilda Canyon. A portion of this road is located within the disturbed area boundary of the Rilda Canyon Portal Facilities (refer to maps 500-1, 500-3, and Figure R645-301-500c). Energy West (now Interwest Mining Company) has worked with Emery County Special Services District #1 (ECSSD#1) and the Emery County Commission to develop an agreement to suspend public use of that portion of EC#306 that runs through the facilities area. This agreement is located in Volume 11 Appendix Volume - Engineering: Appendix B. Refer to Volume 11 Appendix Volume - Engineering: Appendix G for photos of the suspended portion of the road.

R645-301-521.124 Location of Existing Coal Waste

As mentioned above, previous mining occurred in Rilda Canyon at the Leroy Mine, Rominger Mine, Jeppson Mine, and Helco Mine. Map 500-1 shows predisturbed areas associated with these mines. At reclamation of these mines, coal waste material was buried on-site. It is not known to what extent or volume waste coal is buried throughout the area.

R645-301-521.130 Landowners and Right of Entry and Public Interest Maps

Refer to Supplemental Volume (Legal and Financial Information) for description of lands containing surface and subsurface ownership. Refer to Volume 4 Maps 1-1 and 1-2 for locations of ownership.

R645-301-521.140 Mine Maps and Permit Area Maps

The boundaries of the North Rilda Area to be affected for the life of coal mining and reclamation activities are found on Map DU1688 in Volume 11 Appendix Volume - Engineering: Appendix A. Refer to Volume 12, Mill Fork Lease ML-48258 to review all proposed affected areas and discussion of subsidence in the Mill Fork Lease. Subsidence for the North Rilda Area is discussed below in R645-301-525.

R645-301-521.150 Land Surface Configuration Maps

Map 500-1 illustrates the topography prior to construction of the Rilda Canyon Portal Facilities. Contours extend at least 100 feet beyond the area of each disturbance.

R645-301-521.160 Maps and Cross Sections for the Constructed Features

Typical construction sequencing is presented on Map 500-2 in the Maps Section. This map shows the construction sequences that have been used to construct the facilities. Plan views of the existing land surface configuration for the coal mining and reclamation operations in the North Rilda Area are found on maps 500-3. Map 500-3 shows a plan view of the existing disturbance for the 6.77 acre mine facility site as well as the location of the topsoil storage areas. The as-built design for the topsoil pile shows a fenced area of approximately 0.51 acres. The total volume of the pile is approximately 7,862 cubic yards (5,725 cubic yard topsoil and 2,137 cubic yard of substitute topsoil. Refer to the table in ***R645-301-232 Topsoil and Subsoil Removal*** for soil pile capacity.

The facilities pad was developed by cutting and/or filling the surface to create an earthen structure that supports the buildings and storage areas. The facilities pad was cut to the bedrock on the north side of the pad. This bedrock stretches the entire length of the disturbed area boundary and is nearly vertical. The mass balance Table 500-1 below illustrates the cuts and fills required for constructing the facility pad and sedimentation pond. Maps 500-4, 1 of 4 and 2 of 4 show the cross-sections through the facilities area. Map 500-4, 3 of 4 shows the cross-sections through the topsoil pile. Map 500-4, 4 of 4 shows the cross-sections through the sediment pond. Cross-sections are spaced on 50 foot centers and are identified by interval and distance from the starting point (i.e. 15+00, 15+50, etc.). Carlson Software was utilized to calculate the total volumes of cuts and fills. However, as indicated in Table 500-1, there are instances (i.e. coal material removed from the site, void in boulder fills, etc.) that cause inaccuracies of the cut and fill volumes. As shown in the table, those inaccuracies are accounted for and volumes have been adjusted accordingly.

Table 500-1: As-Built Mass Balance for Rilda Portal Facilities

		Area (sf)	Volume (cy)
Facilities/Pond Area			
1	Total Cut		41,284
2	Total Fill**		29,522
Topsoil Pile			
3	Total Cut		-
4	Total Fill***		7,862
Concrete Volume** (removed at reclamation)**			
5	Concrete Pad (Avg. 9" thick)	69,650	1,935
6	Fan Pad (Avg. 5' thick)	6,000	1,111
7	MCC Building (4' crawl space under building)	400	59
8	Total Volume to be Reduced from Item 2		3,105
Hard Armor Areas***			
9	Hilfiker Wall	8,400	249
10	Boulder Pile	20,350	603
11	Sediment Basin Outslope	4,020	119
12	Sediment Pond Outslope	4,375	130
13	Total Volume to be Reduced from Item 2		1,101
Coal/Coal Waste Removed from Area			
14	Coal		290
15	Coal Waste		2,000
16	Total Volume to be Reduced from Item 2		2,290
Culverted Areas (Voids caused by buried culverts)			
17	UC-1: Area = 1.77 ft^2, Length = 72 ft.	1.77	127
18	UC-2: Area = 1.77 ft^2, Length = 148 ft	1.77	262
19	DC-1: Area = 1.77 ft^2, Length = 391 ft.	1.77	692
20	DC-2: Area = 1.77 ft^2, Length = 198 ft.	1.77	350
21	Portion DC-3: Area = 1.77 ft^2, Length = 142 ft.	1.77	251
22	Total Volume to be Reduced from Item 2		1,683
Mass Balance Calculations			
	Total Cut Items(1-(4+8+13+16+22)		25,396
	Total Fill (Item 2)		26,373
	Difference		(977)
	% Difference		-4%

NOTES:

* As-built volumes calculated utilizing aerial survey data and Carlson Software.

** Includes approximately 18,100 cy of imported rock material for construction of Hilfiker wall.

*** Includes both topsoil quantities (approx. 5,725 cy) and substitute topsoil quantities (approx. 2,137 cy) that is segregated and stored at the topsoil pile storage location (Map 500-3). These volumes were hand surveyed in the field. Item 4 was calculated using Carlson Software.

**** Carlson Software calculates volumes according to surface elevations. Concrete is, therefore, part of the cut/fill volumes and must be subtracted from total cut (Item 1).

***** Boulders excavated during construction were utilized as a hard armor BMP or stored. When calculating the cut/fill volumes, voids in the boulders are not considered. For estimation purposes, a 40% void volume is subtracted from the total cut volume for a depth of 2 feet.

****** This difference is probably the result of the importation of fill specified for construction.

Cross-sections associated with the stations on Map 500-3 are shown on Map 500-4. These cross-sections illustrate pre-existing contours, post-construction contours, and reclamation contours. The Carlson Software data is shown on Map 500-3. Reclamation of the facilities is discussed later in this chapter.

Constructed buildings and facilities are shown on Map 500-3. These constructed facilities have been included in the performance bond calculations. Refer to R645-301-800: Bonding, for detailed information.

R645-301-521.170 Transportation Facilities
Primary and secondary roads are described in detail in Section R645-301-527.

R645-301-521.180 Support Facilities
As-built drawings of the Rilda Canyon Portal Facilities are found in Volume 11, Appendix Volume 11A - Engineering, Appendix H. Surface facilities in Rilda Canyon are located at two locations; 1) Left Fork of Rilda Canyon and 2) at the forks of Rilda Canyon.

Left Fork of Rilda Canyon: This facility includes an access road and a pad area which supports two portals, a substation, power line, fan, water storage tank, and pumphouse. Topsoil removed prior to construction of the site is also stored within the permit area of the Left Fork Rilda Canyon fan facilities. Additional information about this facility is provided in Volume 2, Part 3 and Volume 5, Map 3-9A and Map 3-9B.

Rilda Canyon Portal Facilities: This facility is located at the forks of Rilda Canyon and includes the following: Access and Mine Fan Portals, Mine Fan, Facilities Pad, Fuel Dock, Rock Dust Tank, Waste, Rock and Waste Rock Storage Bins, Covered Storage Buildings, Substation, Lift Station, Sediment Basin, Sediment Pond, and Drainage Systems (see Map 500-3 in this chapter). A short discussion of each facility is presented below:

Access and Mine Fan Portals: During the development of the Rilda Canyon Portal Facilities two separate surface breakouts were constructed; 1) Mine (Intake) Access, and 2) Blowing Mine Fan opening. Both portals were developed [from underground] as rocks slopes through the upper member of the Star Point Sandstone (Spring Canyon Member) from the portal facility area to an interception point in the Hiawatha Coal Seam. Methods used to construct this portal and tunneled slope utilized conventional drill and shoot methods. The dimensions of the portal are approximately 20' x 9' rectangular opening. The fan is constructed at the west portal. Mine equipment and men will use the east portal to access the northwestern part of the Deer Creek Mine.

Mine Ventilation Fan: - The fan installation at the Rilda Canyon portal facility is a dual, parallel fan arrangement. The fans are located side-by-side on concrete foundation. The fans are installed in a blowing configuration, taking in outside air and forcing it into the mine. Only one fan will operate at a time. Each fan is driven by an electrical motor. Back-up power is supplied by a diesel generator north of the fan. The motors are housed in steel frame buildings.

Facilities Pad: The facilities pad is constructed utilizing Hilfiker MSE (mechanically stabilized embankment) wall system on the south side of the pad. The fill material with the pad consists of existing subsoil material and imported granular fill (approximately 18,100 cy). The pad is lined with a welded impermeable geofabric membrane and topped with 9" concrete. All precipitation that intercepts the pad is collected through a single drop inlet and piped to the sediment basin. Refer to Map 500-3 and 700-2 for this drainage control location.

Fuel Dock: The fuel dock facility is located near the roadway access on the south side of the pad. This covered and self-contained facility contains two steel storage tanks; 2,500 gallon diesel tank and a 2,500 gallon emulsion tank.

Rock Dust Tank: A 140 ton capacity steel rock dust silo is located on the north side of pad. The silo is mounted on a concrete foundation. Rock dust is pumped into specially equipped rock dust trailers or trucks.

Lift Station: The lift station is a device that allows longwall equipment to be loaded and unloaded from flat-bed trailers. The lift station is located on the south side of the pad next to the fuel dock.

Sediment Basin: The sediment basin is located east of the rock storage area. This structure collects runoff from the facilities pad and road access areas. The basin is equipped with an open riser extending vertically. The riser allows any silt laden runoff to impound behind its embankment. Excess runoff will be conveyed via a 20 inch High Density Polyethelene pipeline to the sediment pond.

Sediment Pond: The Rilda Canyon Facilities include construction of a single sedimentation pond located at the eastern extent of the disturbed area. Analysis utilized to determine the size and hydraulics related to the construction and operation of the sedimentation pond and all supporting drainage structures are included in the Drainage and Sediment Control Plan (refer to Volume 11 Appendix Volume - Hydrology: Appendix B). Note that prior to any construction, temporary sediment control was established to protect the Rilda Canyon creek from additional contributions of sediment. These plans are outlined in the above referenced material.

Waste, Rock, and Waste Rock Storage Bins: The storage bins are located on the east end of the facility pad and are used for bulk storage of rock used in the mine, as well as, a temporary storage for garbage and waste rock material produced from mining operations. The bins are constructed of rebar reinforced concrete. The waste bin encloses a portable steel dumpster that is covered by netting which keeps litter from blowing away in windy conditions.

Covered Storage Bins: There are six covered storage bins throughout the facilities pad area. These bins are utilized to store materials and supplies which will be used as part of the mining operations. The bins are constructed of 6" box beam steel and covered on three sides. Refer to Map 500-3 for the location of these structures.

Substation: Power is supplied to the Rilda Canyon facilities via a 25KV utility service line which parallels the south side of the facility pad. The substation splits the power service into various supply lines and powers the surface operations on the pad. This facility occupies approximately 2,150ft^2 and is completely enclosed by a 7' chain link fence.

A reclosure switch platform is constructed within the existing powerline corridor that allows personnel to trouble shoot power failures before reapplying power back to the Rilda Left and Right Fork Sub-stations. The reclosure switch protects the substations and other electrical installations from automatic re-closing of incoming power from the Power Company. The platform is constructed of steel and extends from the edge of the facilities pad to an area near the power pole where the reclosure switch is installed. All design and construction processes comply with OSHA and NEC safety standards for platform and electrical installations.

Drainage Systems: Two separate drainage systems are utilized at the Rilda Canyon Portal Facility site and classified as either "undisturbed" or "disturbed". The "undisturbed" system collects water above the facility pad and from side slopes adjacent to the site and conveys it past the disturbed area into the natural channel of Rilda Canyon Creek.

The "disturbed" collection system collects runoff from facilities pad and storage areas and conveys it to the sedimentation basin. This system consists of concrete catch basins, CMP culverts and opened ditches designed to adequately collect and pass the peak flow from a 10yr/6hr precipitation event. Refer to Volume 11 Appendix Volume - Hydrology: Appendix B for detailed design and Maps 500-3 and 700-2 for locations.

R645-301-521.200 Signs and Markers Specifications

Permit area identification signs are placed and maintained at each point of access from public roads. Signs identify the business name, address, telephone number, and DOGM identification number of the Deer Creek Mine.

Perimeter markers are placed around all disturbed areas of the Rilda Canyon portal facilities and Left Fork Rilda Canyon fan facilities. Perimeter signs are placed at a reasonable sight distance from one another.

Areas along the Rilda Canyon perennial stream (within 100 feet of the disturbed area of the Rilda Canyon Portal Facilities) are considered a buffer zone and are appropriately posted as such.

The topsoil area is appropriately posted to identify this location. A silt fence, ditch or other appropriate control structure is used to prevent topsoil erosion from the site. Refer to Volume 11 Appendix Volume - Hydrology: Appendix B for a complete description of the Alternative Sediment Control Areas (ASCA's).

R645-301-522 Coal Recovery

This section includes a description of the mine plan and measures used to maximize the use and conservation of the coal resource. The description attempts to show that coal mining and reclamation operations are conducted to maximize the utilization and conservation of the coal, while utilizing the best technology currently available to maintain environmental integrity. This decreases the likelihood of re-affecting the land in the future through coal mining and reclamation operations. Coal Recovery in the Mill Fork area is included in Volume 12, Mill Fork Lease, ML-48258 of the Deer Creek MRP.

Mine Plan: Access to the to North Rilda reserves was achieved with the use of 5-entry set of mains referred to as 4th North Mains. The 4th North Mains are developed northwest (approximately 4000 feet) from the 4th North / 10th West Mains intersection. Mainline development, designated as 5th North, then changed course to a northeast bearing, with development proceeding under the Right Fork area of Rilda Canyon. Selection of the Right Fork stream crossing area was based on the results of an extensive surface exploration program conducted in the Right Fork of Rilda Canyon (refer to Volume 9 maps HM-9, HM-10 and HM-12). A series of six drill holes were completed in 1997 to document coal seam characteristics, structural geology and hydrologic conditions. Drilling was conducted on approximately 250 foot centers across the projected Mill Fork Graben from previously completed drill holes EM-158 and EM-56. No structural discontinuities were identified during drilling. Groundwater encountered during drilling was restricted to minor quantities from the alluvium/colluvial fill (estimated at 2 - 5 GPM) near the bedrock interface. Based upon the results of the surface exploration program, mining below the Right Fork of Rilda Canyon was re-located approximately 800 feet to the west of the original projection. Re-location of the mains to the west increased the overburden from approximately 120 to 200 feet.

Based on the information gained from the surface exploration program, a detailed plan was developed to position the 4th North/5th North intersection to optimize the "no-subsidence" design of the 5th North / Rilda Canyon Right Fork crossing route and rock slope access into the lower Hiawatha Seam as well as maximizing overall reserve recovery within the area.

From the 4th North/5th North intersection, mainline development proceeded to the northern boundary of Federal Coal Lease U-024317. Longwall gateroad development sections were driven due east from the 5th North Mains to the extent of mineable reserves. Six longwall panels were completed in the Blind Canyon Seam, and six longwall panels were completed in the Hiawatha Seam. Sequences of longwall panels extracted in the Blind Canyon Seam were as follows:

Blind Canyon Seam:

Longwall Panel	Coal Lease
11th East	Federal Leases U-06039
	U-024317
	PacifiCorp patent fee claims
12th East	Federal Leases U-06039
	U-024317
	PacifiCorp patent fee claims
14th East	Federal Leases U-06039
	U-024317
	PacifiCorp patent fee claims
15th East	Federal Leases U-024317
9th East	Federal Leases U-06039
	U-024317
	SL-051221
	U-2810
	PacifiCorp patent fee claims
8th East	Federal Leases U-06039
	SL-051221

Hiawatha Seam Access: Access to the to North Rilda Hiawatha seam reserves was achieved with development of rock slopes and vertical raises from the Blind Canyon seam to the Hiawatha seam. From the bottom of the slopes, a 5-entry set of mains referred to as 6th North Mains were developed to the northeast for access to gateroad development in the Hiawatha seam. Main line development was reduced to three entries above 6th Right. The sequences of longwall extracted in the Hiawatha Seam were as follows:

Hiawatha Seam:

Longwall Panel	Coal Lease
5th Right	Federal Leases U-06039
	U-024317
	PacifiCorp patent fee claims
4th Right	Federal Leases U-06039
	U-024317
	PacifiCorp patent fee claims
3rd Right	Federal Leases U-06039
	U-024317
	SL-051221
	U-2810
	PacifiCorp patent fee claims
2nd Right	Federal Leases U-06039
	SL-051221
7th Right	Federal Leases U-06039
	U-024317
8th Right	Federal Leases U-06039
	U-024317

Longwall mining on North Rilda Ridge was completed during August 2004. As indicated above, a total of six panels were extracted in each seam.

Mill Fork Federal Lease (Formerly State Lease ML-48258) Access: Based on data acquired through surface coal exploration programs, Energy West West (now Interwest Mining Company) developed a mine plan to access the Mill Fork State Lease with a set of 6-entry mains driven on a northwest bearing from the 6th North Mains. Mining within the Mill Fork Access corridor was restricted to mainline development. To ensure long term stability, pillars will not be removed (refer to Volume 5 Map 3-7).

Rilda Canyon Portal Facility Access: Based on data acquired through in-mine directional drilling program, Energy West (now Interwest Mining Company) developed a mine plan to access the Rilda Canyon Portal Facility area by extending the 1st Right submains with a set of four entry submains driven southeast toward the Hiawatha coal outcrop near the fork of the Rilda Canyon. Near the Hiawatha outcrop, however, the in-mine directional drilling located a burn area that affects approximately 250 feet of outcrop coal. The intake and travelway breakouts were accomplished by driving a pair of rock slopes to the outside below the burned coal area of the seam. The slope was constructed at the elevation of the mine facilities pad and sloped upward at approximately 8% for approximately 500 feet to intersect the Hiawatha coal seam. The dimensions of the portals are approximately 20' x 9' rectangular opening. Mine equipment currently utilizes the access portal for material supply of underground mining operations. Mine equipment will be transported through the portal to access the northwestern (Mill Fork) reserves of the Deer Creek Mine.

Two northern and two southern panels of each seam extended below the Castlegate Sandstone escarpment. As specified in the lease stipulations, "except at specifically approved locations, the Castlegate escarpment must be protected from mining induced failure". Due to the limited surface exposure of the Castlegate Escarpment, no special monitoring of environmental assessment was deemed necessary for the northern panels. An environmental analysis for full extraction longwall mining beneath the Castlegate Sandstone escarpment has been completed for the two southern panels with an accompanying Decision Notice/FONSI signed (Volume 11 Appendix Volume - Engineering: Appendix C and D). The environmental analysis assessed the following:

a. How much escarpment could fail based on analytical methods, observation of similar areas, geologic/topographic conditions, and panel orientation.

b. What resources would be affected by escarpment failure and description of the nature and magnitude of these effects, ie: vegetation; wildlife and habitat; threatened/endangered and sensitive species; cultural and paleontological resources; hazards; visual quality; etc.

The Castlegate Sandstone escarpment within the North Rilda Permit Application area has been defined in the permit application in two (2) distinct portions:

- *NORTH CASTLEGATE ESCARPMENT - NORTH RILDA AREA*
- *SOUTH CASTLEGATE ESCARPMENT - NORTH RILDA AREA*

North Castlegate Escarpment: The Castlegate Sandstone escarpment within the northern portion of the North Rilda Area (north face of the ridge) has very limited surface exposure due to the presence of talus slopes and forest vegetation which cover most of the escarpment in this area. Due to the limited surface exposure of the Castlegate escarpment, no special monitoring or mine layout protection is planned for the escarpment in this area, i.e.; the four (4) northernmost longwall panels in the Blind Canyon and Hiawatha Seams - North Rilda Area, refer to Volume 11 Appendix Volume - Engineering: Appendix A for complete description and comparison of the North Castlegate Escarpment to previously mined areas.

South Castlegate Escarpment: The Castlegate Sandstone escarpment within the southern portion of the North Rilda Area (south face of ridge) has a prominent surface exposure. Based on an on-going geotechnical study evaluating the potential effects of longwall (full-extraction) mining on the stability of the Castlegate escarpment, i.e.; Cottonwood Newberry Canyon/Corncob Wash and Trail Mountain 5th East/Cottonwood Canyon Test Areas, on-going development of a predictive escarpment/mining model is in progress. The current model developed from these studies was used to forecast anticipated effects of proposed mining under the escarpment within the southern portion of the North Rilda Area, ie: The two (2) most southern longwall panels proposed in the Blind Canyon and Hiawatha Seams - North Rilda Area, refer to R645-301-500: Appendix A for complete description of the Geotechnical Study.

Coal Recovery: The maximum amount of economically recoverable coal will be extracted from the North Rilda Area of the Deer Creek Mine with the exception of protective coal barriers which must be left in place to ensure the integrity of the mine entries associated with the active underground workings and to protect environmentally sensitive surface resources within the Rilda Canyon Fork Area (See R_2P_2 Mine Plan Map [Volume 5, Map 3-6 & 3-7]). These protective coal barriers can be broken into five (5) separate categories:

(1) **Property Boundary Barriers:** All external property boundary lines are protected by a 50 foot (minimum) solid coal "buffer" barrier.

(2) **Protective Main Entry Barriers:** Protective main entry barriers are designed to protect long term mine entries from excessive abutment pressures of the retreating longwall. Design of these barriers are based on (I) intended duration of use, (ii) depth of cover in the area, (iii) geologic conditions present, and (iv) historical performance of similar sized barriers in similar conditions.

(3) **Bleeder Entry Barriers:** Bleeder entry barriers are designed to insure the long term stability of the longwall panel bleeder system. Design of these barriers is based on (I) intended duration of use, (ii) depth of cover in the area, (iii) geologic conditions present, and (iv) historical performance of similar sized barriers in similar conditions. Evaluation of localized conditions at the time of development, in conjunction with the preceding design parameters, will be on-going to determine final barrier sizing so that bleeder entry stability and coal recovery may be optimized.

(4) **Surface and Sub-Surface Resource Protective Barriers:**
(a) In-place coal will be left within the Rilda Canyon fork area to insure the long-term stability and integrity of environmentally sensitive surface and sub-surface resources.
(b) In-place coal will be left within the Mill Fork Access area to ensure the long-term stability and integrity.

(5) **Mining Below the Right Fork of Rilda Canyon**: A portion of the right fork of Rilda Canyon lies within the proposed North Rilda Area Permit Application of the Deer Creek Mine. Due to the environmental sensitivity of the Right Fork area (specifically the sub-surface hydrologic alluvial system and associated surface riparian vegetation zone), a complete analysis of a proposed "no-subsidence" design of the 5th North Mains development within the area of the right fork of Rilda Canyon has been prepared addressing the long term ground stability and subsidence protection of the area with regards to proposed mining. All pre-mining and post-mining conditions have been evaluated based on the best geologic and engineering information currently available (refer to R645-301-500 Engineering Section: Appendix A).

The 4th North Mains consist of a 5-entry development section, bearing northwest from the Deer Creek 10th West Mains. Initial location of the 10th West/4th North intersection was based on the following:

(a) Existing Blind Canyon seam conditions encountered in 10th West Mains development.
(b) Proximity to the projection of the Mill Fork Fault Graben.
(c) Most practical access route to the North Rilda - Blind Canyon and Hiawatha coal reserves, across the North Rilda Canyon Forks area.

A complete analysis of the location and long term ground stability of the 4th North / 10th West Mains and the Left Fork of Rilda Canyon was prepared and submitted by PacifiCorp to the BLM on November 15, 1996. Approval to proceed with relocation and development of the 4th North Mains was given by the BLM (per letter) February 13, 1997.

With regard to PacifiCorp's North Rilda Area Permit Application, the 4th North Mains were originally projected to be developed northwest (approximately 3000 feet), from the 4th North / 10th West Mains intersection. Based on the results of the 1997 surface exploration conducted in the Right Fork of Rilda Canyon, a meeting was held in October 1997 with DOGM, USFS, and BLM to discuss the re-location of the 4/5th intersection to maximize the overburden in the Right Fork stream crossing. The 5th North Mains were re-located approximately 800 feet west of the original projection, increasing the overburden from 120 to approximately 200 feet. Based on the information gained from the surface exploration program, a detailed plan was developed to position the 4th North/5th North intersection to optimize the "no-subsidence" design of long term entry stability for the 5th North / Rilda Canyon Right Fork crossing route and rock slope access into the lower Hiawatha Seam as well as maximizing overall reserve recovery within the area.

It is expected that recovery rates of 85% can be obtained within the proposed longwall panel areas. The overall minable reserve recovery for the North Rilda Canyon area of the Deer Creek Mine is estimated at approximately 65%. In addition to the protective barriers listed above, Energy West (now Interwest Mining Company) has no plans on recovering coal pillars for remaining gateroad and mainline development entries.

The Deer Creek mining plan is based on the geologic information of the area obtained from outcrops, drilling, and previous mining by the operator. For geologic information of this area, refer to R645-301-600 and Volume 8 of the MRP.

R645-301-523 Mining Methods

The following is a description of the mining operation proposed to be conducted during the life of the mine within the North Rilda Canyon Area, including the methods of coal mining, engineering techniques, and anticipated annual and total production of coal.

Continuous Mining Units (Main Entry and Longwall Section Gateroad Development):
The principal purpose of the continuous mining units within the North Rilda Area of the Deer Creek Mine is underground mine development (i.e. section development of mainline entries, longwall section and gate road development, and longwall section setup/bleeder entry development; along with development of mine water holding sumps, rock storage rooms, etc.).

Figure R645-301-500a (Figure Tab) illustrates the basic configuration of a typical five-entry main, consisting of (nominal) 20 feet wide entries and crosscuts driven on standard 80 feet x 100 feet entry centers. The pillars created measure a (nominal) 60 feet wide x 80 feet long; a size which has been developed for sufficient support of the main entries and overlying strata.

A variation to this typical configuration was utilized for the development of main entries underlying the crossing of the Rilda Canyon Right Fork Area. These five-entry mains consist of (nominal) 20 feet wide entries and crosscuts driven on 80 feet x 130 feet entry centers. To eliminate multiple intersections in the stream crossing area, crosscut locations were staggered. The pillars created measure a (nominal) 60 feet wide x 110 feet long; a size which improves long term main entry stability and overlying strata stability through an area of hydrologic and surface resource concern.

Figure R645-301-500a also illustrates the basic configuration of a typical two-entry longwall panel development, consisting of (nominal) 20 feet wide entries and crosscuts driven on (nominal) 50 feet x 100 feet entry centers. With the retreating longwall mining system, all panel development work is accomplished by continuous mining units prior to longwall installation.

Longwall Mining System: The predominant mining method to be used in the North Rilda Area of the Deer Creek Mine is *Longwall Retreat Mining*. This method, as practiced by PacifiCorp, presents the safest and most efficient underground resource recovery mining method available.

As referenced above, the two-entry gateroad system is developed with (nominal) 20 feet wide entries and crosscuts driven on (nominal) 50 feet x 100 feet entry centers. This type of "yield pillar" configuration is designed so that the gateroad pillar will gradually yield as longwall retreat proceeds from panel to panel. The

purpose of this design is to prevent the buildup of unrelieved stresses within the pillar.

Figure R645-301-500b (Figure Tab) illustrates the basic configuration of a retreating longwall system. After gateroad entries are driven to the extent of the longwall panel length, on both sides of the longwall panel, setup and bleeder entries are driven to connect the gateroads. A solid coal barrier is left between the setup and bleeder entries, size based on; (1) intended duration of use, (2) depth of cover in the area, (3) geologic conditions present and (4) historical performance of similar sized barriers in similar conditions.

Longwall face width, depending on the geologic parameters of the coal deposit, varies from 500 feet to 1000 feet wide. Standard face width is 750 feet center to center (from center-line of head-gate belt entry to center-line of tailgate entry), or 730 feet coal block width. Once installed in the setup entry, the longwall begins retreat mining (from the setup entry "outby" toward the main line entries). A protective barrier is left between the mined out longwall panel (extraction face) and the main line entries that is sized to insure long term main line entry stability.

Panels are designed within the mining area, bounded by natural and imposed limits, with varying degrees of confidence as to final location and extent. Faults may vary somewhat from currently assumed locations. Geologic limitations such as seam splits, channel scours, spars, stratigraphic thinning, burned coal areas, etc. may affect resource recovery by varying the mining limits by hundreds of feet as information becomes available and as mining recovery economics and practicality are further refined. Regulatory mining restrictions, such as escarpment protection barriers and perennial stream buffer zones further confine mining extent.

The anticipated production will be obtained by utilizing two to three continuous mining units and one longwall mining system. The Deer Creek Mine normally operates two continuous mining units and one longwall mining system.

The North Rilda Area of the Deer Creek Mine was developed with mains and sub-mains which supported a series of longwall mining panels. This system is very effective in extracting and maximizing coal recovery. Approximately 75% of the Deer Creek minable coal reserve will be extracted by longwall mining systems, 25% will be extracted by continuous miner development.

The extracted coal is transported by underground conveyor belt to the Deer Creek portals, sized in the Deer Creek coal handling facility and conveyed to the PacifiCorp - Huntington Power Plant, approximately two miles away. A portion of the coal was also transferred to the Cottonwood Mine loading facilities via underground conveyor belts and transfer shaft. The loading facility and underground conveyor system is no longer in operation.

The interburden in the minable area where the two seams overlap averages about 80 feet. Multi-seam mining will be evaluated where in interburden thickness of less than 30 feet exist between the two seams.

The mine layout of the Deer Creek mine is illustrated in Volume 5, Maps 3-6 and 3-7. The drawings show an arrangement of longwall panels and development sections interconnected by systems of main and sub-main entries. This arrangement is predicated on geographical dedication of reserves, regulatory mining restrictions, available coal quality, and geologic information.

The planned mine development sequence accommodates longwall panels as the primary means of efficiently extracting the reserves. This will ensure the best possible means of maximizing reserve recovery while maintaining consistent coal quality and ground control. Volume 5, Map 3-6 and Map 3-7 shows the North Rilda Area. Table 3 (Volume 2, Part 3) provides the approximate number of acres affected by mining in five-year increments for the Deer Creek Mine.

Mine Production: Average Production rates for the North Rilda Area were approximately 1,150 tons/machine shift for continuous miners and 9,000 tons/machine shift for the longwall. Table 4 (Volume 2, Part 3) of the MRP lists the anticipated annual and total production of coal at the Deer Creek Mine.

All in-mine coal haulage is by belt conveyor. Of the total entries in the main entry system, at least one entry is dedicated specifically to the belt conveyor. All mine personnel and materials are transported underground by diesel equipment. Table 5 (Volume 2, Part 3) lists the major ancillary equipment used in Deer Creek Mine.

R645-301-524 Blasting and Explosives

The Deer Creek Mine is no longer a producing underground mine (production ceased on January 7, 2015) and there is no anticipated need for any surface blasting activities incident to the underground mining activities. However, if circumstances develop that require surface blasting activities, a plan will be initiated in accordance with DOGM regulations in R645-301-524.

R645-301-524.100 Blaster Certification

All surface blasting incident to underground mining operations will be conducted under the direction of a certified blaster. Blaster certifications will be kept at the blasting site during blasting activities.

A certified blaster and at least one other person will be present at the firing of a blast. The blaster will be familiar with the blasting plan and site specific performance standards (refer to Volume 3 Appendix VI for the approved plan)

R645-301-524.200 Blast Design
Submittal of blast designs for shots will be made to the Division for approval prior to conducting surface blasting at the mine site. A schedule will be presented to the Division prior to conducting blasting activities. The blast design will be prepared and signed by a certified blaster.

R645-301-524.300 Blast Survey
A pre-blasting survey will be conducted as needed.

R645-301-524.400 Blast Schedule
If conducted, the blaster will use audible signals to notify those in the vicinity immediately before the blast. No residents live within one-half mile of the proposed blasting site. All blasting will be conducted between sunrise and sunset.

R645-301-525 Subsidence Control Plan

This section describes in detail the operator's plan to ensure minimal environmental impacts from mine-induced subsidence. The Operation Plan (Volume 2, Part 3) plus the Geology Section (Volume 8) present the detailed data on which the analytical approach for the subsidence control plan is based. The following subsections describe the principal factors involved in controlling subsidence impacts resulting from the proposed mining operations.

For subsidence control and monitoring information specific to the Mill Fork Lease, please refer to Volume 12, Mill Fork Lease, ML-48258 in the Deer Creek MRP.

R645-301-525.100 Subsidence Damage Probability Survey
A survey has been conducted on that portion of East Mountain surface which could possibly be affected by the mining of coal from the North Rilda and Mill Fork areas. It has been determined that there are renewable resources present in the area in the forms of springs, water seeps, grazing land, timber, and wildlife. There are no springs and seeps located above the projected mining activities in the North Rilda Area. The occurrence of the springs is discussed in the hydrology section of this document (Section 700). Only two springs are located within the North Rilda permit area, 80-50 located in Section 29 and the Rilda Canyon Springs located in Section 28 (refer to Volume 9 HM-9 for the location of the springs and Volume 9 - Hydrologic Section of the Deer Creek MRP: Appendix A for sampling sites and monitoring schedule). Most of the streams within the permit area are ephemeral and/or intermittent. Only the lower portion of Rilda Canyon Creek below the Rilda Springs is considered perennial. The streams are fed by springs that emanate primarily in the North Horn Formation west of the permit boundary. Second mining (i.e.

longwall extraction, room & pillar, of the North Rilda area) will be limited to the ridge separating Rilda and Mill Fork canyons and subsidence will not occur beneath the stream channels of these canyons. First mining (i.e. mainline, gateroad development) did occur below the Right Fork of Rilda Canyon. For a complete analysis of the proposed "no subsidence / long term stability" design of the 5th North Mains development within the Right Fork of Rilda Canyon and the long-term stability analysis refer to the Engineering Section R645-301-500 A. To protect the alluvial/colluvial system of the Right Fork of Rilda Canyon a stream buffer zone was established based on the extent of the riparian zone and the angle of draw from the Hiawatha Seam, the lowest seam to be mined. The riparian zone within the Right Fork of Rilda Canyon was delineated by field observation, aerial photography, and map contour analysis. The extent of the identified zone is based on the contact of the alluvial/colluvial fill with the canyon's side slopes. The angle of draw was calculated from the Hiawatha Seam horizon/elevation @ 15 degrees to the point of intersection on the surface. The stream buffer zone delineates the area restricted to full extraction mining. The referenced 15 degree angle of draw is an industry/agency accepted standard used for delineation of surface influence protection from mining areas considered for full extraction mining. Mining experience at PacifiCorp's Deer Creek, Cottonwood, and Trail Mountain mines has provided a sound, scientific basis for using the 15° angle of draw mentioned above (refer to Annual Subsidence Reports of the Deer Creek MPR).

The angle of draw of subsidence produced by full-extraction mining can be influenced by many factors. These include the size of the area mined; number of seams mined, fractures or faults in the overburden, adjacent mine workings, and adjacent areas of burned coal and clinker. If mine workings extend to an area of burned coal, experience has shown that the overburden stresses above the mined area can be transferred to the adjacent burned coal and clinkers which can cause the clinkered areas to fail. In this case, the angle of draw may appear to be very shallow, when the crushing of the clinkered areas is the source of subsidence outside the normal area of influence.

Faults can also influence the angle of draw. If mining occurs adjacent to an existing fault, the area of subsidence will follow the natural plane of weakness formed by the fault. In this case, the angle of draw will be the same as the dip of the fault.

Based on data collected by the U.S. Bureau of Mines and eighteen years of subsidence data collection on East and Trail mountains, the angle of draw is found to be between 0 and 15 degrees from vertical. In some limited areas, the angle of draw is greater than 15 degrees, but in every case, the angle is greater due to the influence of one of the other factors mentioned above.

For planning purposes, any barrier of protection left in the mine to protect surface features should use a 15 degree angle of draw unless one of the factors mentioned above is known to exist in the immediate area.

No structures such as cabins, fencing, water troughs, and stock ponds currently exist within the boundaries of the North Rilda Area. A single gas well (Merit Energy Federal 32-23) is located adjacent to the mine workings in Section 23, T16S, R6E, SLB&M. A cooperative agreement between Merit Energy and PacifiCorp ensured that mine workings were confined in such a way that the well and associated pipeline were not impacted by mining or subsidence.

R645-301-525.200 Protected Areas

The operator will conduct the underground mining operations so as to prevent subsidence from causing material damage to the surface and to maintain the value and reasonable foreseeable use of that surface in accordance with the preceding subsidence control plan.

As mentioned in the PROBABLE HYDROLOGIC CONSEQUENCES DETERMINATION section, (728: Hydrologic Balance - Surface Water System), the drainages conveying runoff away from the permit areas are streams in Rilda, and Mill Fork canyons. Second mining, i.e. longwall extraction, room & pillar, of the North Rilda area will be limited to the ridge separating Rilda and Mill Fork canyons and subsidence will not occur beneath the stream channels of these canyons. First mining, i.e. mainline, gateroad development, will occur below the Right Fork of Rilda Canyon. For a complete analysis of the proposed "no subsidence / long term stability" design of the 4/5th North Mains development within the Right Fork of Rilda and long-term stability analysis, refer to Volume 11 Appendix Volume - Engineering: Appendix A. To protect the alluvial/colluvial system of the Right Fork of Right Fork of Rilda Canyon, a stream buffer zone was established based on the extent of the riparian zone and the angle of draw from the Hiawatha Seam, the lowest seam to be mined. The riparian zone within the Right Fork of Rilda Canyon was delineated by field observation, aerial photography, and map contour analysis. The extent of the identified zone is based on the contact of the alluvial/colluvial fill with the canyon's side slopes. The angle of draw was calculated from the Hiawatha Seam horizon/elevation @ 15 degrees to the point of intersection on the surface. The stream buffer zone delineates the area restricted to full extraction mining. The referenced 15 degree angle of draw is an industry/agency accepted standard used for delineation of surface influence protection from mining areas considered for full extraction mining. Mining experience at PacifiCorp's Deer Creek, Cottonwood, and Trail Mountain mines has provided a sound, scientific basis for using the 15° angle of draw mentioned above (refer to Annual Subsidence Reports of the Deer Creek MPR).

R645-301-525.300 Subsidence Control

The operator intends to minimize surface effects of subsidence by adopting, wherever practical, the longwall mining method and mining the coal deposits as completely as possible. The areas within the mine limits not mined by the longwall method will be mined by continuous miner in development for the longwall system. Approximately seventy-five percent (75%) of the recoverable coal reserve will be mined by the longwall method, the remaining area will be mined by continuous miner units.

The longwall mining method allows almost total extraction of the mineral and induces caving of the immediate and upper roof strata. As the coal seam is extracted, the overlying stratum caves rapidly. The caving process has been shown to propagate to within 100 feet of the surface in less than two weeks after mining. This was determined by a cooperative study conducted by the U.S. Bureau of Mines using Time Domain Reflectometry (TDR). In this study, a coaxial cable was cemented within a drill hole positioned near the center of the 14th West longwall panel in the Cottonwood Mine. As the caving of the strata occurred, the cable would shear or be stretched. The depth of the shears or stretches could be identified with instruments on the surface. The data collected from this study is contained in Volume 3, Appendix IV of the MRP. Surface subsidence has been observed within two months of the coal extraction. In most areas, the subsidence will stabilize within 2 years of mining.

It is the operator's intent to mine areas as wide and long as present mining technology or equipment allows in order to minimize the area which would be on the sloping edge of the subsidence trough. The pillars of support for the longwall gate roads have been designed on the yielding pillar principle so that they will yield to destruction. This has been proven in practice in the mines and therefore will not affect the subsidence trough.

The size of the support coal pillars used in mine planning for both the Blind Canyon and Hiawatha seams to ensure long term stability has been determined by basic calculation for the deepest expected cover (from prior mining practice in the area) and USBM study. Experience has also shown that, in multi-seam mining circumstance, columnizing main entry development pillars in both seams is essential for long term main entry stability.

Full extraction areas, by definition, are planned and can control subsidence in areas. It is anticipated that the planned subsidence will minimize impacts and result in a generally uniform lowering of the surface lands in broad areas, thereby limiting the extent of material damage to those lands and causing no appreciable change to present land uses and renewable resources. Subsidence prediction work has shown that the expected maximum planned and controlled subsidence will vary from zero to fifteen (0-15) feet, assuming that the total cumulative extraction from the two minable seams will not exceed twenty (20) feet.

First Mining, "No Subsidence Restricted" Areas

1) Right Fork of Rilda Canyon
   First mining, (i.e. mainline development), has occurred below the Right Fork of Rilda Canyon. For a complete analysis of the proposed "no subsidence / long term stability" design of the 5th North Mains development within the Right Fork of Rilda Canyon and the long-term stability analysis refer to the Engineering Section R645-301-500 Appendix A.

2) Mill Fork Permit Area (Federal Lease UTU-84554) Access (Hiawatha Seam)
Access to the to North Rilda Hiawatha seam reserves was achieved with the development of rock slopes and vertical raises from the Blind Canyon seam to the lower seam. From the bottom of the slopes, a 5-entry set of mains (referred to as 6th North Mains) were developed to the northeast for access to gateroad development in the Hiawatha seam. Main line development was reduced to three entries above 6th Right.

Based on data acquired through surface coal exploration programs, Energy West (now Interwest Mining Company) developed a mine plan to access the Mill Fork State Lease with a set of 6-entry mains driven on a northwest bearing from the 6th North Mains. Mining within the Mill Fork Access corridor will be restricted to mainline development. To ensure long term stability, pillars will not be removed (refer to Volume 5 Map 3-7).

R645-301-525.400 Subsidence Monitoring Plan

The operator initially adopted a twofold approach to subsidence monitoring:

1) Aerial photogrammetry,
2) On-the-ground monumentation.

After seven years of comparing the two types of surveys it was determined that both methods effectively document the amount of subsidence which has occurred; however, the aerial photogrammetry method has the advantage of showing more detail because more data points can be monitored with less effort. Therefore in 1987, with the concurrence of the State of Utah, Division of Oil, Gas & Mining (DOGM), the operator discontinued on-the-ground monumentation and now collects subsidence data solely by aerial photogrammetry.

The subsidence monitoring program, conducted since 1980, has produced data which not only document the amount of subsidence that has occurred but also allows the operator to predict the amount of subsidence that is likely to occur when mining in new areas. The detail of the data collected in years past is not included herein. If the reader desires to investigate past data, it can be found in the annual subsidence reports on file at DOGM.

Aerial Photogrammetry: PacifiCorp's subsidence monitoring program is primarily based on aerial photogrammetry. A baseline photogrammetric survey was conducted in 1980 which includes over 12,000 elevations measured on a 200-foot spacing grid. These elevations are then compared to elevations measured from the photographs taken annually in August. This method has proven to be the best way to collect subsidence data on East Mountain. In flat areas, with limited vegetation, the elevations can be read from the photographs with a precision of one-half foot. In steeper areas, where cliffs are present, the resolution becomes less reliable, and inaccuracies of greater than ten feet can occur. In

steeper areas, photogrammetric monitoring can, and has been, augmented by conventional survey data. The applicant will maintain survey control aerial targets within the permit boundary necessary to allow the interpretation of coordinates on photos within ±1 foot. Following this procedure the operator has conducted annually an aerial photo survey of all areas which have been undermined until 3 years elapsed after the last date of mining. The operator continued monitoring all areas undermined until it was mutually agreed by the operator and DOGM that the subsidence in the mining area became stable and that no further monitoring is necessary. The findings of the survey shall were reported to DOGM annually in a summary report through 2017.

Special Monitoring - Castlegate Cliff Escarpment

North Castlegate Escarpment - North Rilda Area

The Castlegate Sandstone escarpment within the northern portion of the North Rilda Area has very limited surface exposure due to presence of talus slopes and vegetation that cover the formation in this area. Due to the limited surface exposure of the Castlegate escarpment, no special monitoring or mine layout protection measures was planned for the escarpment in this area (refer to Volume 11 Appendix Volume - Engineering: Appendix A for a comparison of the North Castlegate Escarpment to previously mined areas).

South Castlegate Escarpment - North Rilda Area

The Castlegate escarpment, within the southern portion of the North Rilda Area, has well established surface exposure. Based on a geotechnical study evaluating the potential effects of longwall (full-extraction) mining on the stability of the Castlegate Sandstone escarpment, i.e. Cottonwood Newberry Canyon/Corncob Wash and Trail Mountain 5th East Cottonwood Canyon Test Areas, development of a predictive escarpment/mining model was developed and presented to DOGM, USFS and BLM. The model developed from these studies was used to forecast anticipated effects of proposed mining under the escarpment within the southern portion of the North Rilda Canyon Area, i.e. two (2) southern-most longwall panels proposed in the Blind Canyon and Hiawatha Seams - North Rilda Area (See R_2P_2 Mine Plan Maps Volume 5, Maps 3-6 & 3-7). Based on the predictive escarpment/mining model, areas of potential cliff escarpment failure were monitored with photogrammetric methods, augmented by conventional survey data.

To comply with the special monitoring stipulation referenced in the environmental assessment, "Deer Creek Mine will also monitor subsidence through their mine plan requirements and as proposed, provide higher resolution monitoring data for the North slope of Rilda Canyon by installing prisms for accurate surveying on the top of the escarpment", PacifiCorp installed a series of prisms in 1999 to document subsidence features of Castlegate escarpment (Refer to Map DU1688E in Volume 11 Appendix Volume - Engineering: Appendix A).

Prisms PR-1, PR-2, and PR-3 were installed in February 1999 prior to full extraction mining. Prisms PR-4, PR-5, and PR-6 were installed in June 1999.

All prisms were monitored prior to mining to establish baseline values and percent error variations. During the mining process, prisms were monitored daily until the movement stabilized. Data from the prism monitoring has been reported in each Annual Subsidence report.

In addition to the prism monitoring, PacifiCorp installed warning signs in Rilda Canyon prior to undermining the two southern panels.

After undermining the prisms, each were found to have moved within a few days or weeks after mining was completed. Movement continued throughout 2002 and 2003. Since 2003, the prisms movements have essentially stabilized. Energy West (now Interwest Mining Company) considers the subsidence to be complete and monitoring has discontinued. Prism data has been reported in the annual subsidence report each year from 2000 to 2007.

PacifiCorp did cooperate with the surface land management agency (U.S.D.A. Forest Service) in an environmental analysis of the potential impacts. Final mining approval of the referenced southern longwall panels was granted based on the objective evaluation of the predictive model and assessment of potential surface impact from full-extraction mining within the affected area. The environmental analysis is complete with the associated Decision Notice/FONSI signed on 11/1/99 (see Volume 11 Appendix Volume - Engineering: Appendix C and D in this section) and DOGM consent dated November 10, 1999 (Volume 11 Appendix Volume - Engineering: Appendix E).

R645-301-525.500 Repair of Damage

Should significant subsidence impacts occur, the applicant will restore, to the extent technologically and economically feasible, those surface lands that were reduced in reasonably foreseeable use as a result of such subsidence to a condition capable of supporting pre-subsidence reasonably foreseeable uses.

In order to restore any land affected by operations to a condition capable of supporting the current and post-mining land uses stated herein, the operator will replace water determined to have been lost or adversely affected as a result of operator's mining operations if such loss or adverse impact occurs prior to final bond release. The water will be replaced from an alternate source in sufficient quantity and quality to maintain the current and post-mining land uses as stated herein.

During the course of regular monitoring activities required by the permit, or as the operator otherwise acquires knowledge, the operator will advise DOGM and the surface land management agency of the loss or adverse occurrence discussed above, within ten working days of having determined that it has occurred. Within ten working days after DOGM

notifies operator in writing that it has determined that the water loss is the result of the operator's mining operation, the operator will meet with DOGM to determine if a plan for replacement is necessary and, if so, establish a schedule for submittal of a plan to replace the affected water. Upon acceptance of the plan by DOGM, the plan shall be implemented. The operator reserves the right to appeal DOGM's water loss determinations as well as the proposed plan and schedule for water replacement as provided by Utah Code Ann. 40-10-22(3)(a).

As outlined earlier, there are no springs or seeps located above the projected mining activities in the North Rilda Area. Most of the streams within the permit and affected areas are ephemeral and/or intermittent. Only the lower portion of Rilda Canyon Creek below the forks is considered perennial. The streams are fed by springs that emanate primarily in the North Horn Formation west of the permit boundary. Second mining, i.e. longwall extraction, room & pillar, of the North Rilda area will be limited to the ridge separating Rilda and Mill Fork canyons and subsidence will not occur beneath the stream channels of these canyons. First mining (i.e. mainline) gate road development will occur below the Right Fork of Rilda Canyon. For a complete analysis of the proposed "no subsidence / long term stability" design of the 5th North Mains development within the Right Fork of Rilda Canyon and long-term stability analysis refer to the Engineering Section Volume 11 Appendix Volume - Engineering: Appendix A. To protect the alluvial/colluvial system of the Right Fork of Rilda Canyon a stream buffer zone was established based on the extent of the riparian zone and the angle of draw from the Hiawatha Seam, the lowest seam to be mined. The riparian zone within the Right Fork of Rilda Canyon was delineated by field observation, aerial photography, and map contour analysis. The extent of the identified zone is based on the contact of the alluvial/colluvial fill with the canyon's side slopes. The angle of draw was calculated from the Hiawatha Seam horizon/elevation @ 15 degrees to the point of intersection on the surface. The stream buffer zone delineates the area restricted to full extraction mining. The referenced 15 degree angle of draw is an industry/agency accepted standard used for delineation of surface influence protection from mining areas considered for full extraction mining. Mining experience at PacifiCorp's Deer Creek, Cottonwood, and Trail Mountain mines has provided a sound, scientific basis for using the 15° angle of draw mentioned above (refer to Annual Subsidence Reports of the Deer Creek MPR).

R645-301-525.700 Public Notice

The operator will not mine in any areas that would allow potential subsidence effects (as indicated by the angle of draw) to affect any area outside of the lease and affected area boundary until this constraint on coal recovery is resolved by OSM and BLM or permission is granted by the adjacent surface agencies. A mining schedule; which details the area in which mining is to take place and the planned date of the mining activity, has been submitted to the affected surface owners.

R645-301-526 Mine Facilities

Support facilities exist and have been constructed in Rilda Canyon, a tributary of Huntington Canyon; Left Fork Fan Facilities, and Rilda Canyon Portal Facilities. The Left Fork Fan Facilities pad and access road of this area occupy approximately 2.01 acres of Manti-La Sal National Forest land in the NW1/4, NW1/4, SE1/4 of Section 29, T16S, R7E, SLM. These facilities include an access road and a pad area which supports two portals, a substation, power line, fan, water storage tank, and pumphouse. Topsoil removed prior to construction of the site is stored within the disturbed area of the Left Fork Rilda Canyon facilities.

Vehicular access in the Left Fork portal area has been limited to the public turn-around area below the portal facilities. However, the Left Fork road continues to serve as a Forest Development Trail, allowing access by horseback and foot travel up the Left Fork of Rilda Canyon and beyond the fan facility area. Access to the facility pad is controlled with fencing and a locked gate at the point where the road enters the pad. The existing trail continues beyond this point.

As the Deer Creek Mine has ceased production and has been decommissioning and recovering the mine since January 2015, the road leading to the Left Fork portals will be used for underground equipment recovery, access to the underground workings as other parts of the mine are sealed, and reclamation of the portal sites and the access road. This is specialized one-time work for the recovery and reclamation of the mine, mine portals and the access road itself.

During the winter months, snow fall depths on the access road can hamper and greatly delay access. If and when snow depth along the access road becomes greater than 12 inches, snow removal activities will be practiced.

Snow removal activities will be accomplished by push, pickup, load and haul techniques. Snow volumes will be hauled to the Deer Creek Mine active waste rock site via ten wheel dump trucks and placed for proper treatment of the snow melt runoff. Side casting of snow into the Left Fork Rilda Creek drainage or the adjacent road ditch will not be practiced.

Specific locations and other information regarding the access road and facility pad in Left Fork Rilda Canyon are shown in Volume 4, Maps 2-15A and 2-17A; Volume 5, Maps 3-9A and 3-9B; and Volume 6, Maps 4-1A and 4-4A (Sheets 1, 2 and 3). More specific information about each of the structures and facilities is provided in the MRP. [Volume 2, Part 3 entitled "MINE FACILITIES (Rilda Canyon)"].

Rilda Canyon Portal Facility is located on a 7.28 (including soil storage area) acre site approximately 2.0 miles from the mouth of Rilda Canyon. Of the 7.28 acres of actual disturbance, approximately 1.79 acres were previously disturbed by earlier mining which leaves only 5.49 acres of additional disturbance needed for the surface facilities. The site is characterized by moderate vegetation and rugged, steep terrain. Surface facilities as described

in R645-301-521.180, include the following: Access and Mine Fan Portals, Mine Fan, Facilities Pad, Fuel Dock, Rock Dust Tank, Waste, Rock and Waste Rock Storage Bins, Covered Storage Buildings, Substation, Lift Station, Sediment Basin, Sediment Pond, and Drainage Systems. A pre-disturbance topography map is constructed to show the contour of the canyon prior to any construction activities. This map is found in the Maps Section as Map 500-1. As-built construction cross-sections are found on Map 500-4. All construction cut slopes and fills conform to the recommendations outlined in the Geotechnical Study found in Volume 11, Appendix Volume - Engineering: Appendix F.

R645-301-526.110 Mine Structures and Facilities

As illustrated on Map 500-1, three abandoned mines exist on the north side of Rilda Canyon: Leroy, Rominger, and Jeppson mines (also refer to photos A through C in Volume 11 Appendix Volume - Engineering: Appendix G, Previously Disturbed Areas). These areas were reclaimed by AML in 1988. No structure presently exists in connection with these mines except for their respective reclaimed footprints. The lower portion of the Leroy Mine is utilized for the location of the sediment pond. Approximately 1.5 acres of pre-disturbance exists at this site where coal was buried during reclamation activities conducted by AML. The soil covering this coal was stripped off and stored during construction activities. The coal was hauled off to the existing Deer Creek waste rock site (now owned and controlled by Bowie Refined Coals LLC. under a separate permit) or utilized if the quality proved acceptable. Substitute topsoil stripped from the facilities area and was stored at the topsoil storage area which is located next to the NEWUSSD spring collection facility. Both topsoil and substitute topsoil (approximately 7,862 cubic yards) are stored at this location until reclamation activities commence.

The North Emery Water Users Special Service District (NEWUSSD) spring system (refer to photos D through F in Volume 11 Appendix Volume - Engineering: Appendix G (Previously Disturbed Areas) consists of a series of collection lines extending westward up Rilda Canyon and southward up a small side drainage as shown on Map HM-8 (refer to Volume 9 - Hydrologic Section of the Deer Creek MRP). The NEWUSSD spring system is metered at four locations. Meter 1 (Side Canyon Spring) is located at the downstream end of a collection line which enters Rilda Canyon from the South. Meter 2 (Side Canyon Spring plus South Spring) is located near the bottom of the main east-west trending collection line which lies to the south of Rilda Canyon Creek at a point just upstream (west) of the main spring collection box. Meter 3 (North Spring) records flows for the east-west central collection line which was constructed through the central portions of the valley near Rilda Canyon Creek. Meter 4 (North Spring) collects data from the north collection line located on the north side of Rilda Canyon Creek. Meter 3 and Meter 4 were combined in 1995 during the Rilda Canyon road improvement project.

In addition to the main spring collection lines, there are two flumes in the vicinity which monitor flow rates within Rilda Canyon Creek. The upper flume, RCF-2, is located adjacent to the extreme west end of the spring collection system monitored by Meter 4. Flume RCF-3 is located in Rilda Canyon Creek adjacent to spring collection Meter 2.

Initially five shallow wells were located in the area surrounding the spring collection system to monitor groundwater level fluctuations through time. The locations of the wells are shown on Volume 9 Map HM-9. Wells 1 through 5 are relatively shallow wells which were constructed prior to 1989 by West Appa Coal Company. In 1990, two additional large diameter wells were developed, (Wells 6 and 7) adjacent to wells P-2 and P-3, respectively, in order to obtain more complete groundwater data through aquifer testing. Wells P-2 and P-3 were abandoned and sealed in 1995.

R645-301-526.116.1 Mining Within 100 Feet of Public Road

PacifiCorp intends to conduct coal mining and reclamation activities within 100 feet of Emery County Road #306. However, in 2005, PacifiCorp entered into two separate agreements with Emery County Special Services District No. 1 to encroach upon their right of way in Rilda Canyon. Agreement #1 is made to reconstruct, realign, widen, and surface County Road #306 to allow for increase speed and increased traffic. Agreement #2 is made to allow a portion of this road to be temporarily restricted from public use. The restricted use area starts approximately 1/4 mile west of the cattle guard and extend approximately 2,300 feet to the mine gate in the left fork of Rilda Canyon (refer to Figure R645-301-500c). A copy of Agreements #1 and #2 are found in Volume 11 Appendix Volume - Engineering: Appendix B. Access will be given to Emery County Road Department officials and North Emery Water Users Special Services District for periodic inspection and maintenance of their facilities and also to regulatory and other governmental agencies so they may access their jurisdictional areas. Photos of the suspended portion of the road are found in Volume 11 Appendix Volume - Engineering: Appendix G (Existing Road).

R645-301-526.116.2 Relocating a Public Road

Emery County Road #306 exists in the location of the North Rilda Canyon portal facilities. This road runs approximately 3.0 miles from the Huntington Canyon road, Highway 31, to the turnaround area in the Left Fork of Rilda Canyon. It is owned and maintained by Emery County Special Service District No. 1. As mentioned above, an agreement has been constructed between PacifiCorp and Emery County to suspend the public use of a portion of EC #306. Approximately 2,300 feet of the road has been temporarily eliminated through the facilities throughout the life of the mine. At time of reclamation, the suspended portion of the road will be reconstructed in its original location and to its original design. The design and construction plans are the property of Emery County Road District and are better known as Rilda Canyon Road Change Order #1. PacifiCorp has retained a copy of these plans and formatted them onto a CD. These plans can be reviewed in Volume 11 Appendix Volume - Engineering: Appendix G. Reclamation and replacement of the road will be completed to the standards found in these original road designs. Figure R645-301-500c in the Figures Section shows the location of the road and typical road section.

As this restricted use area eliminates public access to the former Forest Service trail system in the canyon, PacifiCorp's Agreement #1 with ECSSD#1 includes the construction of a new trailhead and parking area on the east end of the mine facilities and the reconstruction of the county road (see detailed design in Figure R645-301-500c in the Figures Section and discussion in the Reclamation Plan below). PacifiCorp has established a trail (in

cooperation with the USFS) on the south side of Rilda Creek that by-passes the mining facilities. The trail crosses the Rilda Canyon creek and travels parallel to the creek to a point where it reconnects to the existing trail as shown in Figure R645-301-500c. The trail has been constructed to comply with USFS design parameters. Upon reclamation, the trail will be eradicated and the road will be relocated to its original location.

R645-301-526.200 Utility Installation and Support Facilities

As described above, North Emery Water Users Special Services District (NEWUSSD) possesses a spring collection system in Rilda Canyon near the mine facilities location (refer to Map 500-1). Water transmission lines associated with the spring collection system have been located to protect against damage from mining operations in the areas in which they pass through the disturbed area.

As Emery County Road #306 was reconstructed (2007), PacifiCorp cooperated with NEWUSSD to insure protection of water transmission lines. Location and design of EC#306 is within the jurisdiction of the Emery County Road Department. Plans for the road can be reviewed in Volume 11 Appendix Volume - Engineering: Appendix G. Support facilities were previously discussed in R645-301-521.180. Construction and operation of these facilities were in accordance to applicable Emery County Building Codes. Drawings and specifications were submitted to the Emery County building inspector for their review.

R645-301-527 Transportation Facilities

The Rilda Canyon operations utilize roads in association with the facilities described in the above sections. The Left Fork Rilda Canyon Fan Facilities are described in Volume 2, Part 3. A description of the transportation facilities is detailed below.

Roads

The Deer Creek Mine Rilda Canyon operations utilize two roads as follows:

(a) Left Fork Rilda Canyon Access Road
(b) Emery County Road #306 (Rilda Canyon Portal Facility)

Left Fork Rilda Canyon Access Road: The Left Fork Rilda Canyon Facility Access Road is approximately 1150 feet in length (see Map 3-9A and 3-9B in Volume 5). It follows the north side of the Left Fork of Rilda Canyon from the end of the county road (suspended from public access in 2005) to the facility pad. The existing road/trail was upgraded to a gravel surfaced road in 1995 with an average width of 11 feet and an average grade of approximately 8%. The road was designed in accordance with recommendations from the surface management agency (Manti-LaSal National Forest). See R645-301-534 below and Volume 2, Part 3 for additional information.

Emery County Road #306 (Rilda Canyon Portal Facility): PacifiCorp has entered into an agreement with Emery County Special Services District #1 to reconstruct/realign county road #306 (Agreement #1 in Volume 11 Appendix Volume - Engineering: Appendix B). This road is utilized by traffic related to the mine as well for recreational and grazing purposes. The road has been completely asphalted (completed 2007) with a trailhead and parking area constructed of the Rilda Canyon Portal Facility.

This portion of the road is owned and operated by ECSSD #1. However, during winter months snow removal will be required along the entire length of this road. As this is the responsibility of the Emery County Road Department, PacifiCorp may find the need to assist the road department by clearing snow from EC#306 by contracting this work to a private contractor. PacifiCorp will require the contractor to use a deicing product as specified by Emery County on the county portion of the road to make the road safe for mine personnel and other local traffic. The deicing product will not be stored on-site but can be acquired at the Deer Creek portal facilities. No salt will be used within the disturbed areas of the Rilda Canyon Portal Facilities.

R645-301-527.100 Road Classification

Only one primary road exists within the disturbed area of the Rilda Canyon portal facility area. This road begins at the mine gate (the end of public access from EC #306and terminates at the facilities pad. This road is utilized daily by mine personnel and supply truck deliveries. The length of the primary is approximately 1,326 feet and coated with asphalt. The foundation of the road is identical to the reconstructed road EC#306. The main components of the foundation are the sub-grade, sub-base, base course, and surface cover. There are no embankments associated with this road.

The subgrade is the native underlying soil that serves as the primary foundation for the road and facilities pad. Placement of the subgrade was completed in specific lifts and did not exceed 8 inches. Compaction was over the full depth of the fill to at least 95% of the maximum dry density as determined by the AASHTO T-180 test procedures. Refer to the Geotechnical Study provided by AMEC Earth and Environmental Inc. in Volume 11, Appendix Volume - Engineering: Appendix F.

The subbase is a compacted granular material between the subgrade and the base course. Typically, the subbase thickness is between 12 inches and 18 inches for the loads that are expected at the mine site. Aggregate and gradation specifications are less stringent than the specifications for the base course.

The base course is the surface layer directly beneath the surface cover. The material has strict specifications for strength, stability, hardness, aggregate type and gradation. Typical thickness of the base course is 6 inches which should provide a stable base for the surface covering material.

The surface covering material consists of bituminous material and mineral aggregates that are well graded. The cover is typically 4 inches thick. As with all foundation layers for the primary road construction, the specifications for the material and construction are detailed by the design. A typical illustration for road base design and location of primary is found on Map 500-3 in the Maps Section. Original designs for this portion of the road are found in Volume 11 - Appendix Volume 11A – Engineering: Appendix G. These designs will be accessed and utilized to replace the road back to its original condition and location at time of reclamation of the site.

R645-301-528 Handling and Disposal of Coal, Overburden, Excess Spoil and Coal Mine Waste

As discussed earlier, approximately 1.79 acres of the facility was disturbed as a result of previous coal mining and other activities. Geotechnical investigations conducted during April 2004 delineated an area of approximately 0.7 acres of buried coal directly below the Leroy Mine. It was estimated that at least 3,600 tons was buried based on the following: 1) average depth of 4.0 feet, 2) in-place weight of 60 lbs/ft^3, 3) area: 30,302 ft^2. Coal waste encountered during soil salvaging and construction of the sediment pond was segregated separately and transported to the Deer Creek Waste Rock Site (now owned and controlled by Bowie Refined Coals LLC. under a separate permit) for disposal or utilized if the coal quality allowed. Quality data is found in Volume 11 Appendix Volume - Soils: Appendix A, EIS Report, Appendix 6.2, Soil Testing Data, Sample ID RIL1003.

In 2006, coal and coal waste were excavated and removed from the sediment pond area by track-hoe and truck. The quantity of coal removed was 744 tons (accounted for by weigh scales) or 249 cubic yards. This coal was shipped by truck to the Huntington Power Plant and utilized for power generation. Coal waste removed from the site was approximately 2000 cubic yards. This material was transported by truck to the Deer Creek Waste Rock Site for permanent disposal.

During operations in Rilda Canyon, very limited amounts of coal mine waste (waste rock) were transported through the Rilda Canyon portals. Most waste rock was removed through the Deer Creek portals. The Deer Creek MRP includes a narrative explaining the construction, modification, use, maintenance, and removal of coal, overburden, excess spoil, and coal mine waste through the Deer Creek portals (sealed and backfilled in April 2015).

R645-301-528.330 Non-Coal Waste

All non-coal wastes generated during mining activities and removed from the mine through the Rilda Canyon portals will be placed and stored in a controlled manner in a designated portion of the disturbed area as shown on Map 500-3. The materials will be removed from the site and disposed of in an approved disposal facility.

R645-301-529 Management of Mine Openings

Two (2) portals are located in the Left Fork of Rilda Canyon which support intake and return ventilation entries for the operation of the mine. Underground access to the Rilda Canyon Portal Facilities is achieved by the continuation of a set of three entry 1st Right Submains and development of two rock slopes to the portal facility area near the intersection of the Right and Left Forks. All of the development has occurred in the Hiawatha coal seam and Starpoint Sandstone immediately beneath the coal seam. During the development of the Rilda Canyon Portal Facilities two separate surface breakouts were constructed; 1) Mine Fan, and 2) Intake Access. Both portals were developed [from underground] as rocks slopes through the upper member of the Star Point Sandstone (Spring Canyon Member) from the portal facility area to an interception point in the Hiawatha Coal Seam. Methods used to construct this portal and tunneled slope utilized conventional drill and shoot methods as well as conventional mining methods. The dimensions of the portals are approximately 20' x 9' rectangular opening. The fan is constructed at the west portal. Mine equipment and materials will utilize the east portal to access the northwestern part of the Deer Creek Mine.

Sealing of the portals in the Left Fork Rilda Canyon is detailed in Volume 2, Part 4, Reclamation Plan. Sealing of the portals in the Rilda Canyon portal facility is detailed in the reclamation plan in Section R645-301-540 (also refer to Figure R645-301-500d).

R645-301-530 OPERATIONAL DESIGN CRITERIA AND PLANS

R645-301-531 General

This section includes a general plan for precipitation runoff management, sediment control, impoundment design, road design, and coal mine waste handling plans. Actual construction drawings for the Rilda facilities were developed by Jones and DeMille Engineers and can be found in Volume 11, Appendix Volume 11A – Engineering, Appendix H.

R645-301-532 Sediment Control

The Rilda Canyon portal facilities (not including soil storage area) cover approximately 6.77 acres of disturbed area. All water within this area will be conveyed to drop drains, ditches, and/or culvert systems. Sediment control allows for undisturbed runoff to bypass the facilities via a diversion ditch and culvert system into the Rilda Creek. Disturbed runoff from the facilities pad area reports to a single drop drain and diverted to the sediment basin via buried culvert system. Over flow from the disturbed system is diverted through a buried culvert to the sediment pond located below NEWUSSD spring collection area. Refer to Volume 11, Appendix Volume 11B – Hydrology: Appendix B for the specific design of this system.

R645-301-532.200 Stabilization

Sediment control on cut and fill slopes and soil piles will be accomplished primarily by revegetation. Prior to the establishment of vegetation, the slopes will be protected by the application of a surface tackifier, rock mulch, erosion control fabric, and/or other means approved by the Division. An undisturbed drainage ditch has been constructed at the toe of the cut slopes along the north side of the facility pad to divert all undisturbed drainage away from the disturbed area. Diversion ditches are protected using protective barriers to physically separate the disturbed from the undisturbed areas.

Other sediment control measures are discussed in detail in the Hydrology Section.

R645-301-533 Impoundments

As described previously, a sediment pond is utilized to collect storm water runoff from the disturbed area of the surface facility area. The design of the pond is found in Volume 11 Appendix Volume - Hydrology: Appendix B. Pond design encompasses approximately 1.0 acre of disturbed land.

R645-301-533.200 Foundations

The pond is designed as an incised structure. Foundations for embankments and impounding structures are constructed as outlined in the Geotechnical Study conducted by AMEC (refer to Volume 11 Appendix Volume - Engineering: Appendix F). A construction summary is given below.

Foundations were constructed by first stripping the area of vegetation and topsoil. Large boulders were removed to a depth of at least two feet below the base of the impounding structure. The natural exposed subgrade was compacted utilizing the excavation equipment used at the pond area. At least three passes were made over the natural soils with this equipment.

Embankment fills were placed in horizontal lifts not exceeding 12 inches in loose thickness. Moderate to large sized boulders were removed prior to placement. Fill was compacted throughout by the double passing of construction, spreading, or hauling equipment over the embankment surface. Side slopes are constructed to not exceed 2 horizontal and 1 vertical.

R645-301-533.300 Side Slope Protection

To protect against infiltration, the pond was over-excavated two (2) feet, compacted, and lined with clay on the bottom and sides. Areas where embankment fills were necessary (south and east sides), vegetation was planted or the slopes were armored with rock riprap to protect against erosion. Refer to R645-301-300: Biology for seed mix.

R645-301-533.700 Plans

A complete plan and design for the pond is found in Volume 11 Appendix Volume - Hydrology: Appendix B. Total as-built volume of the sediment pond is 1.71 ac. ft.. Sediment volume contribution from the disturbed area is negligible (0.0716 ac. ft./yr.) especially when the sediment basin is accounted for. The pond will be cleaned of sediment when the depth of sediment reaches 40% of the total volume of the pond or 7.4 feet in depth.

There are no underground operations below this pond that could potentially impact the structure. The pond will be utilized during the life of the mining operations and will be removed at reclamation.

R645-301-534 Roads

Left Fork Rilda Canyon: The Left Fork Rilda Canyon Fan Access Road is approximately 1,150 feet in length. It follows the north side of the Left Fork of Rilda Canyon from the turnaround above the Rilda Canyon Portal Facilities to the Left Fork facility pad. The existing road/trail was upgraded to a gravel surfaced road with an average travel width of 11 feet an average grade of approximately 8%. The road was designed in accordance with recommendations from the surface management agency (Manti-LaSal National Forest).

Drainage control is provided by a ditch along the north side of the road. The ditch is armored with type L, D50 = 9" riprap at stations 3+36 to 6+55, 7+69 to 9+89 and 11+82 to 13+96 to comply with DOGM and Forest Service Stipulations (refer to Map 3-9B in Volume 5). Additionally, Map 3-9B, illustrates the typical rip rapped ditch installation. Flows in the ditch are controlled by rip rap. An 18" diameter CMP culvert carries the flow beneath the road and into the natural drainage system. Further information regarding drainage controls along the access road is found in Volume 3: Appendix VII, Surface Runoff Control Plan, prepared by Hansen, Allen & Luce.

The road and culverts will be removed during final reclamation from the site and the Forest Development Trail will be re-established. Refer to the Reclamation Plan for the Left Fork Rilda Canyon fan facilities in Volume 2, Part 4.

Rilda Canyon Portal Facilities: Prior to the construction of the facilities pad, a portion of the Emery County Road #306 existed within the proposed boundaries of the Rilda Canyon Portal Facilities. This road runs approximately 3.0 miles from the Huntington Canyon road, Highway 31, to the turnaround area in the Left Fork of Rilda Canyon. It is owned and maintained by Emery County Special Service District No. 1. A portion of this road has been temporarily restricted for public use in order to allow PacifiCorp to conduct mining and reclamation operations. The restricted use area starts approximately 1/4 mile west of the cattle guard and extends approximately 2,300 feet to the mine gate in the left fork of Rilda Canyon (refer to Figure R645-301-500c).

As this restricted use area cuts off public access to the Forest Service trail system in the canyon, PacifiCorp has entered into an agreement with Emery County (Agreement #1) to construct a new trailhead and parking area east of the mine facilities. PacifiCorp established a trail that by-passes the mining facilities and connects into the existing Forest Service trail system. Upon reclamation, the trail will be left in place and the road will be relocated to its original location. (Refer to original design of road in Volume 11 Appendix Volume - Engineering: Appendix G

All roads associated with the Rilda Canyon Portal Facilities have been designed to ensure environmental protection and safety appropriate for their planned duration and use, including consideration of the type and size of equipment used. The design and construction of the roads incorporate appropriate limits for surface drainage control, culvert placement, culvert size, and all design criteria established by the Division and Forest Service. Actual construction drawings, including plans for primary road construction, for the Rilda facilities were developed by Jones and DeMille Engineers and can be found in Volume 11, Appendix Volume 11A – Engineering, Appendix H. Safety factors that apply to the Hilfiker Retaining Wall are outlined in this appendix.

R645-301-535 Spoil

For a discussion on spoil of the Deer Creek Mine, refer to Vol. 2, Part 3 of the MRP.

R645-301-536 Coal Mine Waste

The Deer Creek Mine ceased production in January 2015. The southern portion of the mine was separated (by the construction of the 3rd North cross-cut 138 seals) from the Mill Fork Area and the portals at the Deer Creek canyon facility. The only active portion of the Deer Creek Mine is accessed through the Left Fork portals and Rilda Canyon Portal Facilities. Ventilation and water pumping activities are the only operations occurring in the North Rilda and Mill Fork areas of the underground mine. Therefore this section is no longer applicable. All non-coal waste generated at the Rilda Canyon facilities will be handled as outlined in R645-301-528.330.

R645-301-537 Regraded Slopes

There will be no spoil or underground development waste used to regrade slopes to achieve approximate original contour. Slopes for the Rilda Canyon Portal facilities will be constructed using the rock, subsoil and topsoil material.

R645-301-540 RECLAMATION PLANS

Reclamation of the Left Fork Fan Facility is detailed in Volume 2, Part 4 of the Deer Creek MRP. The reclamation of the Rilda Canyon Portal Facilities is detailed in the following sections.

R645-301-541 General

As required by R645-301-540, the applicant intends to conduct final reclamation as follows:

1. Provide for a mine water drainage system.
2. Remove existing structures.
3. Remove buried diversion systems, where necessary, and provide 100yr/6hr storm event channels.
4. Re-contour the disturbed area to blend in with the existing surroundings.
5. Stabilize all fill structures.
6. Reconstruct Emery County Road #306
7. Reduce sediment loading to receiving streams by incorporating Best Management Practices (BMP's).
8. Vegetate all disturbed areas to meet minimum requirements of plant cover, diversity and production as compared to the reference areas.
9. Meet the stated post-mining land use.
10. Achieve bond release.

R645-301-541.100 Mine Closure

At the completion of mining and prior to sealing portals at the Right Fork facility, PacifiCorp must address the issues related to the management of intercepted ground waters. A permanent post-mine gravity drainage system is proposed at the Deer Creek portals and at the North Rilda Canyon Right Fork portals. Design for the Deer Creek portal seals is found in Volume 2. These facilities were constructed in May 2015. The design for sealing the Right Fork portals is found in the Figures Tab as Figure R645-301-500d. Diversions have been constructed inside the mine workings to ensure all ground water is diverted to the portals. Screens and rock check dams will be used to filter out debris from plugging the French drain system (see figure R645-301-500d) in each of the portals. Mine water drainage quality and quantity is better described in the Hydrology Section of Volume 12. The design of the drainage facility at the Right Fork portals is described below.

It is projected that intercepted water will naturally flow out of the Right Fork portals. However, a discharge permit cannot be issued for the Right Fork portals because the portals are located within a Category 1 Water Designation (see definition in UAC R317.2). Therefore, appropriate management of the intercepted ground water must be established to allow for the mine to cease operations and seal the mine.

PacifiCorp originally proposed to build water-retaining bulkheads inside the mine to contain all of the intercepted ground water in the underground workings in perpetuity. However, those

efforts (since late 2014) were rejected by the Mine Safety and Health Administration (MSHA) and DOGM in April 2016. The rejection of those plans required PacifiCorp to develop alternative plans to manage intercepted ground water and allow this water to drain from the Right Fork portals.

To comply with state and federal policy and regulation, PacifiCorp proposes to construct a 5.6 mile 10 inch high-density polyethylene (HDPE) gravity flow water pipeline from the North Rilda Canyon Right Fork portals to the Raw Water Pond at the Huntington Power Plant. The pipeline will be constructed within the existing Emery County Road #306 right of way for 12,553 feet (2.4 miles), and within the State Route (SR-31) right of way for 14,537 feet (2.8 miles). This activity could temporarily disrupt up to approximately 12 acres (pipeline route + proposed treatment plant area + laydown areas). However, because the pipeline will remain installed in perpetuity, no reclamation is planned for this structure. Any minor disturbance that occurs as a result of this project will be immediately remediated. The pipeline corridor will be located within the Deer Creek Mine permit area (see permit description in Appendix G of the Legal/Financial Volume).

Flow meters will be placed on each end of the pipeline (see design) for flow comparison and leak detection. Vent pipes will be placed strategically along the pipeline to ensure no vapor locking occurs and water continues to flow freely. A tee will is planned near the raw water pond and used to redirect the water to the Huntington River when the quality allows a discharge into Huntington Creek and approval is granted by the Utah Division of Water Quality (UDWQ) through the Utah Pollution Discharge Elimination System (UPDES). At the time of this writing, the UDWQ is in the process of determining water quality limitations and parameters for monitoring. Monitoring of those parameters shall be made at this location.

R645-301-541.300 Structure Removal

Following the completion of sealing the mine and constructing the pipeline, work will begin on the demolition of surface facilities. All structural steel, metal siding and other building materials except concrete will be dismantled and disposed of off the permit area. These structures include, but are not limited to:

- Fan and fan housing
- Fuel storage tank
- Substations
- Oil storage tank
- Fences
- Covered Storage Bins
- Rock dust silo
- Coal and Non-Coal Waste Bins
- Facilities Pad and MSE Wall

All foundations and structures built of concrete will be broken up and buried on-site, permanently stored underground, or taken to the waste rock site for disposal. There is approximately 3,046 cy of in-place concrete at the Rilda Canyon Portal Facility. It is estimated that the density for in-place concrete is approximately 150 lbs/ft^3. For crushed concrete, the estimated density is approximately 110 lbs/ft^3. The volume of crushed concrete increases the volume of in-place concrete about 27%. Using these density

estimates, the volume of concrete to dispose at the Rilda Canyon Portal Facility will be approximately 3,868 cy. Any excess demolition material will be used to backfill the portals or taken to the waste rock site for disposal. All asphalt material from the disturbed area will be excavated and taken to a permitted class IV landfill. For cut and fill quantities, refer to Table 500-1 above and R645-301-553 and Map 500-4 for cross-sections.

R645-301-542 Narratives, Maps, and Plans

A detailed timetable for the completion of each major step in reclamation is outlined in R645-301-300: Biology, Table 300-5. Pre-reclamation surface configurations for the Rilda Canyon Portal Facility are located on Maps 500-3 and 500-4. These drawings show the location and extent of surface disturbances due to coal mining and reclamation activities at the portal facility. A detailed plan for backfilling, soil stabilization, compacting and grading is outlined below in R645-301-553, Backfilling and Grading. Certified contour maps, cross-sections, and soil placement maps can be found in the map sections of this volume.

R645-301-542.600 Roads

Emery County road #306 within the area of the surface facilities will be reconstructed as part of the post mining land use. The road will be replaced in the approximate original location that it existed prior to the construction of the facilities area. The road will be reconstructed as per the designs of Emery County Special Service District #1, Change Order No. 1, November 1994. These designs are the property of Emery County. A copy can be reviewed in Volume 11 Appendix Volume - Engineering: Appendix G. The mine water drainage pipeline below the mine site shall be constructed on the north shoulder of the road and cross to the south side of the road just below the cattle guard at the turnaround (refer to design in Volume 11 A, Appendix Volume, Engineering Section, Appendix I). All sections of the pipeline below the mine site will be confined to the boundaries of the county and state road ROW's. All drainage structures under the reconstructed portion of the road will be replaced. Sediment control will be that control stated in R645-301-552, Permanent Features and R645-301-553.100, Disturbed Areas.

R645-301-550 RECLAMATION DESIGN CRITERIA AND PLANS

Reclamation activities at the Rilda Canyon Portal Facility will include plans and designs for 1) Casing and sealing of portals, 2) Permanent features, and 3) Backfilling and grading. These plans and designs are outlined below.

R645-301-551 Casing and Sealing Underground Openings

The Rilda Canyon Portal Facility has a total of two (2) portals of which one (1) is a blowing fan installation. These portals are located on the surface facility map, Map 500-3. The plan for sealing these portals consists of a permanent, plug-type seal with at least 25 feet of non-combustible material compacted, to the extent possible, to form an earthen plug (see Figure R645-301-500d in the Figures Section).

As mining is completed and the mine is closed, PacifiCorp will need to manage the intercepted mine water that emanates from the north and east ends of the Mill Fork Area. Because the elevation of the portals at the Rilda Canyon Portal Facility drainage from the Mill Fork Area workings will flow toward these portals.

PacifiCorp attempted to manage the intercepted water by designing water-retaining bulkheads to contain all of the intercepted groundwater in the underground mine workings in perpetuity. Efforts undertaken since late 2014 to obtain permission from the Mine Safety and Health Administration (MSHA) and the Division to permanently retain intercepted groundwater underground with concrete bulkheads and possibly to direct overflow water to the Deer Creek Canyon were rejected in April of 2016. MSHA and the Division will not allow any water retention as part of the Deer Creek closure plans; therefore, water must be directed to the portals to flow unimpeded out of the mine. This response by the agencies necessitates that PacifiCorp develop other alternatives to manage intercepted groundwater that would otherwise discharge from the Rilda Canyon portals in violation of Utah Annotated Code R317-2 of the water quality regulations.

PacifiCorp is now planning and preparing for the intercepted mine water to drain from the portals at the Rilda Canyon Portal Facility in compliance with Utah Coal Regulations of R645-301-731.521. And, to be compliant with the Antidegradation Policy criteria, the mine discharge water may not be discharged into the Category 1 waters of Rilda Canyon. Therefore, because of this criteria and concerns for the water quality of the discharge, PacifiCorp is proposing to collect the mine water drainage at the portals and transport it via a buried pipeline to the Huntington Power Plant and consume it as part of the electric generation processes. For a more detailed discussion of the quantity and quality of the mine discharge, refer to Volume 12, Hydrology Section.

Figure R645-301-500d includes a French drain designed behind portal plugs for collection of mine water drainage. Each portal entry design includes two (2) 100 foot long perforated 14" dia. HDPE pipes installed and includes a safety overflow system. The perforated pipe will be covered with 3 feet of 4"- 6" drain rock. Two solid 14" dia. HDPE pipes will be installed through the portal plug connecting the French drain system to the drain pipe (refer to the design drawing in Figure R645-301-500d in the Figures Section). The drain pipe will transfer all mine water drainage down and adjacent to the Emery County road #306 to Highway 31. Along Highway 31, the pipeline will be installed adjacent to road and be routed to the diversion bridge at the Huntington Power Plant. The pipeline will cross the bridge and be routed to the Raw Water Pond where it will utilized in the generation of electricity. The design of the pipeline is found in Volume 11A Appendix Volume – Engineering, Appendix I.

The earthen plugs will extend out of the portals and be graded to match the topography that existed prior to mining and reclamation activities in this area. There are no highwalls associated with the Right Fork portals. No coal seam has been exposed. All concrete and asphalt materials that are crushed and removed from the pad areas, storage bunkers, roads, etc. will be permanently disposed of on-site or transported to an approved landfill. Compliance to MSHA requirements for ventilation will be followed during this backfilling activity. Backfilling and grading of the portals and mine site is detailed below.

R645-301-552 Permanent Features

Small depressions (pocks) will be constructed to retain moisture, minimize erosion, create and enhance wildlife habitat, and assist revegetation. The pocks will be constructed with a track-hoe or similar machinery and placed in random order. The pocks will measure approximately 1.5 feet deep by 3.0 feet in diameter. Pocking techniques and sediment loss is explained in detail in the Soil and Hydrology sections.

R645-301-553 Backfilling and Grading

Once the structures have been removed and the portals sealed as outlined in Figure R645-301-500d, backfilling and grading will commence. Reclamation will be accomplished by systematically reclaiming the Rilda Canyon Portal Facility starting at the uppermost part of the disturbed area, working down. Prior to initiating backfilling and grading process at the facility area, the entire area will ripped with a dozer to a depth of approximately two feet to reduce soil compaction. Various stages of the reclamation process may be occurring simultaneously in different parts of the site. Working from top to bottom will minimize handling and compaction of the material in the reclaimed areas and allow the sedimentation structures below the reclamation work to remain in place. Backfilling and grading the disturbed area of the mine site will be conducted to achieve approximate original contour (AOC) of the entire site. At completion of backfilling and grading, the sediment pond will be removed. The clay liner will be disposed of on-site by burying at least four (4) feet below the final surface configuration. Recontouring will be completed as detailed on Map 500-4. Cut/fill quantities are balanced as outlined in Table 500-2 below. Map 500-5 shows final reclamation topography of the entire mine site.

Table 500-2: Mass Balance of Cut/Fill Volume for Reclamation.

	Faclilities*/Pond Area	Area (sf)	Volume (cy)
1	Total Cut		25,553
2	Total Fill		6,762
	Hard Armor Areas* **		
3	Hilfiker Wall	8,400	249
4	Boulder Pile	20,350	603

5	Sediment Basin Outslope	4,020	119
6	Sediment Pond Outslope	4,375	130
7	Total Volume to be Reduced from Cut		1,101
	Topsoil Pile**		
8	Total		7,000
	Mass Balance Calculations		
	Total Cut (Items 1-7+8)		31,452
	Total Fill (Item 2)		26,762
	Difference		4,690
	% Difference*****		15%

NOTES:

* As-built volumes calculated utilizing aerial survey data and Carlson Software.

** Includes approximately 18,100 cy of imported rock material used during the construction of the Hilfiker wall. Imported material will be placed at bottom of all fill areas.

*** Boulders in these areas consist of a 40% void. Therefore, a 40% volume in this area (item 4) is subtracted from the total cut (item 1). Depth of the areas average 2ft.

**** Approximately 10 inches of topsoil will be used to cover the topsoil pile footprint to aid in vegetation growth.

***** The excess 4,690 cubic yards will be used to provide additional topsoil depth throughout the site.

Note in the table above, the hard armored areas consist of an estimated 40% void space. This space is accounted for in Item 7 and is subtracted from the total cut in Item 1. The volume of the topsoil pile is added back in which gives an excess of 4,690 cubic yards of material. This additional material will be spread throughout the site to increase the depth (approximately 1 ½ inches) of the planting medium. Also note that only 7,000 cubic yards is utilized in the reclamation of the mine site when Table 500-1 showed a volume of 7,862 cubic. Approximately 862 cubic yards will be utilized at the topsoil pile site to enhance the growth medium in this area. Depth of topsoil in this area will be approximately 10 inches.

Upon completion of backfilling and grading and topsoil placement, the entire area will be pocked to minimize (or eliminate) erosion and sediment transport from the reclamation site. Pocks will be constructed on slopes of 4:1 or greater using the bucket of a track-hoe or similar machinery to an approximately size of 3.0' diameter x 1.5' deep. Slopes flatter than 4:1 will be roughened using a harrow or similar implement. Reclamation of the soil placement area will be conducted as outlined in R645-301-200.

R645-301-553.100 Disturbed Areas

At time of mine closure, an additional permit and impact area will be delineated along the Emery County Road #306 and SR 31 and end at the Huntington Plant raw water pond. An area (250' x 250') will be set aside for the unlikely event that the mine water drainage does not meet water quality standards and must be treated. In this case, PacifiCorp will construct a facility to treat the water to comply with set water quality standards in order to discharge

into Huntington Creek. If this facility is constructed, a reclamation bond will be established to cover the cost for reclamation.

As for the reclamation of the mine site disturbed areas, all slopes are planned for a 2:1 or less grade. All slopes will be constructed to achieve a minimum long-term safety factor of 1.3 and will prevent unstable slopes. The vertical rock outcrop exposed by the initial portal development will be completely eliminated to meet approximate original contour provisions. All slopes will be compatible with the post-mining land use of the area and will provide adequate drainage.

Since the sub-drainage areas in the reclaimed area are ephemeral and rarely receive flow, the drainage systems through the site will be armored with rock but not designed as a riprapped channel. Final surface configuration (Map 500-5) will channel any drainage that may occur from the undisturbed area through the reclaimed armored channels. Drainage will then be conveyed to road culverts (refer to Figure R645-301-500c for location) to direct flow beneath the EC#306 (see R645-301-542.600, Roads). Culvert outlets will extend beyond the south side of EC#306. Runoff will then flow overland through the buffer area for an average of approximately 50 feet before contacting Rilda Creek. Silt fences or other approve sediment control will be placed so that the disturbed runoff will be treated prior to entering the Rilda Creek. After two years of vegetation growth, these structures will be removed.

R645-301-553.130 Slope Stability Analysis

With the soil conditions, slope, and aspect being similar to that of the Des Bee Dove Mine site, the recommendations made by RB&G Engineering (refer to Des Bee Dove Mine, Appendix XIV, Phase 1 Reclamation, Engineering Section, Appendix C) for slope stability will be used for the Rilda Canyon Portal Facility reclamation. Their analysis assumed strength parameters for foundation fills and embankment fills. It was assumed that the foundation soils consisted of loose to medium dense granular fill extending to a depth of at least 10 feet below the existing level surface. A friction angle of 32° with zero cohesion was conservatively assumed for this material. All reclaimed slopes should be equal to or less than 2 horizontal and 1 vertical.

Based upon the results of their analysis and experience in the compaction of similar material in the Phase 1 and Phase 2 Des Bee Dove Mine reclamation project, slope stability can achieve at least a 1.3 safety factor by compacting lifts not exceeding 1 foot in thickness a minimum of four passes with a rubber-tired dozer or sheepsfoot. The Geotechnical Study by AMEC Earth and Environmental Inc. (Volume 11 Appendix Volume - Engineering: Appendix F) concurs with RB&G recommendations. However, their recommendations use only two passes of construction, spreading, or hauling equipment.

No slope failures have occurred at the Des Bee Dove reclaimed site since completion in 2003.

The forest trail which was constructed in association to the mine facilities will left in place so that recreationalist can park at the existing trailhead below the cattle guard on the Emery County Road #306

As a final step in reclamation of the Rilda Canyon portal facilities, the entire reclaimed area will be seeded and hydromulched as outlined in the Biology Section.

R645-301-560 PERFORMANCE STANDARDS

Coal mining and reclamation operations will be conducted in accordance with the approved permit and requirements of R645-301-510 through R645-301-553.

R645-301-600 GEOLOGY SECTION

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R645-301-610 INTRODUCTION

This part of the application provides a detailed description of the geology of the coal resources, surrounding strata, and surface features within the North Rilda Area including the North Rilda Canyon Portal Facility area.

Since 1971, detailed data on the geology of the coal deposits within the permit and surrounding area have been collected, compiled, and analyzed by PacifiCorp and several government agencies. Information collected by PacifiCorp is the result of exploratory drilling, field investigations, geologic mapping, field sampling, aerial photography, and mapping of underground mine workings.

PacifiCorp has also used numerous geologic reference works by previous authors and agencies specifically written about the coal deposits of this area for the preparation of this section.

R645-301-611 General Requirements

The geology within PacifiCorp's mining areas is discussed in Sections R645-301-620 through R645-301-627.

R645-301-611.200 Proposed operations as given under R645-301-630

Proposed mining operations are discussed in section R645-301-500, including mine layout and sequencing.

R645-301-612 Certification

All maps, drawings and figures within R645-301-600 have been prepared by a licensed professional geologist.

R645-301-620 Environmental Descriptions

In 1997 PacifiCorp received approval to expand its mining operations in Rilda Canyon (Refer to Introduction Section Figures A: Blind Canyon Seam and Figure B: Hiawatha Seam). This expansion involved increasing the size of the Deer Creek adjacent area by 1,960 acres. An additional 50 acres was added in 1998 upon completion of a lease modification to Federal Lease U-06039 (modification Number 2). In 2001, PacifiCorp applied and received approval to modify Federal Lease U-06039 for third time for an additional 65.7 acres (Modification Number 3). Because of its northern location relative to the existing adjacent area and Rilda Canyon, the area of expansion is simply called the "North Rilda Area".

The Wasatch Plateau is one of several high plateaus in central Utah located along the western boundary of the Colorado Plateau geological province. The geology of this region is

characterized by flat-lying sedimentary rocks, ranging in age from Paleozoic to Recent, with simple geologic structures such as gentle folds and mostly normal faulting. This thick "layer-cake" of sedimentary rocks has been deeply dissected by erosion. The North Rilda and Mill Fork areas consists of the surface and subsurface coal resources that underlie the north end of East Mountain, one of several high, narrow east-west ridges that make up the Wasatch Plateau. Elevations range from 7,500 feet in the lowest areas to over 9,600 feet at the ridge top, resulting in a broad diversity of climatic conditions and flora and fauna over the area. Annual rainfall in the region ranges from about 10 inches per year in the lower canyon bottoms to over 30 inches per year in high elevation areas. The dry climate of this area promotes erosion by inhibiting plant growth at lower elevations and on south-facing slopes.

A. REGIONAL GEOLOGY:

The Energy West (now Interwest Mining Company) Mining Company (now Interwest Mining Company) mines mining operations are located in the central portion of the Wasatch Plateau Coal Field in Emery County, Utah. Generally, this area is a series of high, flat-topped mesas flanked by heavily vegetated slopes which extend downward to precipitous cliffs. Below these cliffs, steep slopes gradually flatten out into a broad flat valley (Castle Valley) below. Topographic relief of up to 5,000 feet can be measured from the top of the plateau to Castle Valley below. Horizontal coal seams occur within the strata of the Wasatch Plateau, about halfway between the valley floor and the top. The following discussion summarizes the stratigraphy and structural geology of the region and within the North Rilda Area. The regional geology of the Colorado Plateau in which the Wasatch Plateau coal field is situated is fairly simple. Sedimentary rocks have been accumulating in this region since Permian time (refer to Figure GF-1, Figure Tab).

A broad, high, flat region that encompasses southeastern Utah, southwestern Colorado, northwestern New Mexico, and northern Arizona, the Colorado Plateau has been an area of relative stability while mountain-building episodes have occurred in surrounding regions. The thick accumulations of sedimentary rocks in this region are being deeply dissected by erosion, leaving the most recent coal reserves in the higher plateaus, where they are now being mined. The Energy West (now Interwest Mining Company) adjacent area covers portions of East Mountain and Trail Mountain, which are separated by Cottonwood Canyon, a deep, partially glaciated valley.

During late Cretaceous (Campanian) time, from 75 – 85 million years ago, the Wasatch Plateau region lay at the edge of the Western Interior Cretaceous Seaway, with the sea to the southeast and a range of mountains (the Sevier Orogeny) to the northwest. Streams from these mountains brought eroded sediments southeast to the sea. Stagnant areas between these stream and river channels contained swamps in which peat accumulated. These stream channel and coal swamp deposits are now called the Blackhawk formation, a member of the Mesaverde Group of Cretaceous formations. During Campanian time, the sea advanced and receded several times, leading to the formation of several stacked coal seams within the Blackhawk sediments. The coal seams present in the Energy West (now Interwest Mining Company) adjacent area are named from lowest (oldest) to highest (youngest) the Hiawatha, Cottonwood, and Blind Canyon Seams. The Hiawatha and Blind Canyon seams are separated by 30 – 140 feet of interburden.

B. REGIONAL GEOLOGY SEDIMENTARY FORMATIONS:

Numerous sedimentary rock formations are exposed in the Wasatch Plateau both above and below the coal bearing Blackhawk formation. Mining and construction activities affect a number of these, and the composition, arrangement, and physical characteristics of these formations greatly affect the mining and hydrologic characteristics of the area.

The geologic formations exposed in the Energy West (now Interwest Mining Company) adjacent area range from Upper Cretaceous (100 million years old) to Tertiary and Recent in age (refer to Figures GF-1 and GF-2 [Figure Tab] and Volume 12 Mill Fork Lease Geologic Section Map MFU1823D). These formations, in ascending order from oldest to youngest, are the Masuk Shale member of the Mancos Shale, the Star Point Sandstone, the Blackhawk Formation, the Castlegate Sandstone, the Upper Price River Formation (all Cretaceous), and the North Horn Formation. The coal deposits are restricted to the lower portion of the Blackhawk Formation, about 2,500 feet below the top of the Plateau. Recent geologic deposits include numerous stream terrace gravels along streams and rivers, glacial till deposits in the upper reaches of Cottonwood Canyon, and alluvial and colluvial fills in all of the significant drainages.

The Masuk Shale is the upper-most marine member of the Mancos Shale and consists of light to medium gray marine mudstones. This formation weathers readily, forming gray slopes that are often covered by debris and little or no vegetative cover. The Masuk shale is several hundred feet in thickness, and is the lowest and oldest of the geologic units exposed in the adjacent area. This formation is generally devoid of groundwater.

Overlying and intertonguing with the Masuk Shale is the Star Point Sandstone; a beach-front sandstone. In the East Mountain area the Star Point Sandstone usually consists of three prominent massive cliff-forming beach-front sandstones totaling about 400 feet in thickness. These sandstone "tongues" are named from bottom to top: the Panther, the Storrs, and the Spring Canyon. In between the three tongues are beds of the Masuk Shale. The intertonguing of the Star Point and Masuk shale represents three transgression / regression episodes along the shoreline of the Cretaceous Interior seaway. The upper contact of the Star Point Sandstone is usually abrupt and readily identifiable on outcrops. Even though the Star Point Sandstone underlies almost the entire permit and adjacent area, the low permeability and lack of recharge limit its usefulness as a water producing aquifer. The Star Point Sandstone occasionally exhibits aquifer characteristics in localized areas. These are isolated occurrences where regional faults have created secondary permeability and have been intersected by major canyons with perennial streams. An example of this type of occurrence is Little Bear spring located in Huntington Canyon.

The Blackhawk Formation consists of alternating mudstones, siltstones, sandstones, and coal. Although coal beds are generally found throughout the Blackhawk Formation, the thickest economically mineable seams are restricted to the lower 150 feet of the formation. The sandstones contained within the Blackhawk Formation are mostly fluvial stream channel deposits and increase in number in the upper portions of the formation. Fluvial sandstone channels that are in contact with the top of the coal seams occasionally cut into the coal (due to the erosion of peat by stream erosion during deposition) and create thinned coal zones called "scours." Many of the tabular sandstones and sandstone channels contain perched water, mostly in fractures, joints, and bedding

planes. The permeability of these sandstones is relatively low. Mudstones surrounding these channels usually function as aquicludes. The total thickness of the Blackhawk Formation in the East Mountain area is about 750 feet. The Blackhawk Formation usually forms a broad, consistent slope between the Star Point Sandstone cliffs below and the Castlegate Sandstone cliffs above.

The Castlegate Sandstone is the lower member of the Price River Formation. The Castlegate Sandstone sits on top of the Blackhawk Formation and forms a prominent 300-foot cliff in highly eroded areas of the southern outcrops of the permit and adjacent areas (the southern end of the Cottonwood and Trail Mountain mines), steep blocky slopes in moderately eroded areas (Rilda Canyon), and occasional blocky outcrops in forested or heavily vegetated areas (Mill Fork Canyon). The Castlegate Sandstone consists of about 200 to 400 feet of coarse-grained, arkosic, light tan fluvial sandstones, pebble conglomerates, and minor layers of mudstone.

The Upper Price River Formation, which overlies the Castlegate Sandstone, is about 600 to 800 feet thick and forms slopes which extend upward from the Castlegate Sandstone escarpment. The Upper Price River Formation is comprised predominantly of fine to course-grained sandstone but commonly contains mudstone beds between the point bar deposits. Although some mudstones are present, fine-grained, poorly sorted (occasionally conglomeratic) sandstones dominate the Upper Price River Formation.

The North Horn Formation is about 500 to 1000 feet thick in the East Mountain area. The North Horn Formation spans the Cretaceous-Tertiary boundary (65 million years ago). Mudstones and claystones dominate the rock types present and are generally gray to light brown in color, although black, pink, purple and greenish colors have been seen. The lower two thirds (upper Cretaceous in age) of the formation is generally highly bentonitic mudstone. Localized, lenticular sandstone channels are present throughout the formation. The sandstone beds are more common near the upper and lower contacts of the formation. The North Horn formation, because of the soft rock types present, is prone to slumping. Widespread areas of slumping and hummocky terrain are present in North Horn outcrops.

The Flagstaff Limestone is the youngest (Paleocene) and highest formation exposed in the permit and adjacent areas and consists of dense, white to light gray lacustrine limestone with abundant fossil shells. Resistant to erosion, remnants of 100 to 150 feet of this formation remain, forming caps on the highest plateaus.

Between the time of sediment accumulation and erosion, the sedimentary rocks of the Wasatch plateau were intruded by widely scattered igneous dikes. The approximate age of these dikes ranges from 8 to 24 million years. Though more common in the northern parts of the Wasatch Plateau, several dikes are known to exist within the Genwal Mine, just to the north of the northern adjacent area boundary. These dikes are only a few feet or inches wide, and are traceable for only a few hundred feet. The extent and continuity of these dikes at depth is unknown, and the effects on mining, if any, are unknown at this time.

Stream terrace gravels have been deposited along the major rivers and valley floors at various historic erosional levels, and lay unconformably on top of the Masuk shale. These terrace gravels

are extensively used locally for construction gravels. Some are partially cemented together by caliche – type calcareous cement. None of these terrace gravels occur at or above the coal mining levels. None of these gravels contain groundwater.
Glacial-till deposits are present in the upper half of Cottonwood Canyon. The classic 'U"- shaped valley and presence of a terminal moraine show that this valley contained a small glacier during the last Pleistocene ice age (10,000 to 12,000 years ago). The depth of this till ranges from 80 to 150 feet thick at the valley floor. The groundwater characteristics of this till and the groundwater hydrology of Cottonwood Canyon are being closely monitored by Energy West (now Interwest Mining Company) Mining Company.

Most of the main drainages and side canyons in the permit and adjacent areas contain alluvial fill as a valley floor material. The depth of this fill material can be up to 100 feet in some of the major stream valleys. Seasonal streams, ground water, and various springs are present in these alluvial fills. The groundwater and surface water hydrology of these alluvial materials are closely studied and monitored by Energy West (now Interwest Mining Company) Mining Company.

C. STRUCTURAL FEATURES:

Several important structural features, the Straight Canyon Syncline, Flat Canyon Anticline and Huntington Anticline, the Roans Canyon Fault Graben, Mill Fork Fault Graben, Left Fork Fault Graben, Pleasant Valley Fault, and the Deer Creek Fault, have been identified adjacent to and within the Mill Fork adjacent mining area (refer to Volume 12 R645-301-600 Map MFU-1823D, Geologic Formations Map).

Folding:
Strata in the Mill Fork area are gently folded in two broad structural features. The Flat Canyon Anticline crosses the southeastern portion of the adjacent area. This anticline trends southwest to northeast, and plunges to the southwest. Dips in the anticline range from two to six degrees with the south limb dipping the steepest.

To the north, the north limb of the Flat Canyon Anticline becomes the south limb of the Crandall Canyon Syncline, a flat-bottomed syncline. This syncline also trends southwest to northeast. Dips on the northwest side are much steeper than on the southeast side.

Faulting:
The only known faulting near the North Rilda Area is the Mill Fork fault graben. The Mill Fork fault graben passes to the southeast of the adjacent area (refer to Volume 12 R645-301-600 Map MFU-1823D, Geologic Formations Map). This fault graben was crossed in ARCO's Huntington Canyon #4 Mine in Mill Fork Canyon and has a displacement of about twenty five (25) feet on the each side. The trend of this fault zone is approximately N 40° E. Based on projections from maps of #4 Mine, this graben should pass by the through the northwest corner of the North Rilda Area, between the Mill Fork lease and the existing Deer Creek Mine. Where it crosses the northern end of East Mountain, the fault has been mapped to have a displacement of thirty (30) feet down on the northwest side. Deer Creek mine workings have intercepted a small fault of 7' displacement, down on the west side in the Mill Fork Access mains at XC-29, followed by a very small

displacement (<1') fault, upthrown on the west side. This small fault "graben," though not inline with the projected fault zone, is surely related to it. This fault zone does not appear in any surface outcrops.

The Joes Valley Fault form the western boundary of the Mill Fork reserves. Displacement is over 1,500 feet, down thrown to the west, forming the Joes Valley graben.

D. GEOLOGY OF THE NORTH RILDA CANYON PORTAL FACILITIES:

Geology of the North Rilda Canyon Portal Facility consists of following formations in ascending order: Star Point Sandstone, Blackhawk, Castle Gate Sandstone and Upper Price River (refer to Figure GF-2, Figure Tab). As discussed in the Land Use Section, the Rilda Canyon Facilities are located near an area previously disturbed by coal mining activities (refer to R645-301-400 Map 400-1).

The disturbed area associated the North Rilda Canyon Portal Facilities is situated in the interface between the Quaternary Colluvium Deposits and the Cretaceous Star Point Sandstone and Blackhawk formations. Colluvium deposits of Rilda Canyon consist of slopewash materials of sandy gravel with varying amounts of silt and clay and sandstone boulders and blocks of varying thickness. Near the forks of Rilda Canyon, outcrops of the Star Point Sandstone Formation are restricted to the upper member referred to as the Spring Canyon Member. At the east end of the disturbed area in the location of the sediment pond, geotechnical trenching exposed the upper portion of the middle member, referred to as the Storrs Member. Members of the Star Point Sandstone are separated by intertonguing of the Mancos Shale. Blackhawk Formation exposures at the facility area consist of alternating layers of mudstones, siltstones, sandstone and coal. Two main coal seams are present; in ascending order they are, Hiawatha situated directly above the Upper Member of the Star Point Sandstone - Spring Canyon Member and Blind Canyon located approximately 80 feet above the Hiawatha. Both seams are burnt on the outcrop, with the distinctive redish brown appearance; refer to map 600-1 for a plan view and cross section through the area.

Underground access to the North Rilda Canyon Portal Facilities is achieved by the continuation of a set of three entry 1st Right Submains and development of two rock slopes to the portal facility area near the intersection of the right and left forks. All of the development occurs in the Hiawatha coal seam. During the development of the North Rilda Canyon Portal Facilities two separate surface breakouts were constructed; 1) Mine Fan, and 2) Intake Access (refer to R645-301-500 Engineering Section). Both portals were developed as rocks slopes developed through the upper member of the Star Point Sandstone (Spring Canyon Member) from the portal facility area to an interception point in the Hiawatha Coal Seam.

R645-301-622 Cross-sections, Maps, and Plans

Map 600-1 (Drawing DS1882D), Rilda Canyon General Geology Well P-7 Cross Section & Profile and HM-9 (Volume 9 Hydrology) shows the locations and elevations on the surface of all exploration drillholes and test wells within the North Rilda Area. Twenty-four (24) coal

exploration holes have been drilled within the North Rilda Area to date (August, 04). All of the drill holes completed were drilled by Energy West (now Interwest Mining Company) from 1978 to 1997.

R645-301-621.200 Nature, Depth, and Thickness of the Coal Seams to Be Mined

Mining operations at PacifiCorp's mines have historically mined the two major seams present in the area, the Blind Canyon (upper) and the Hiawatha (lower) seams. A minor, unsuccessful attempt to mine the Cottonwood seam (middle) was made in the Wilberg mine, but the seam was too thin. Cottonwood seam mine workings are insignificant in the overall operation. The coal-bearing portion of the Blackhawk formation is the lower half of the formation, with the Hiawatha seam at or just above the interface between the Blackhawk formation and the Star Point Sandstone below.

Both the Hiawatha and Blind Canyon coals are ranked as High-Volatile Bituminous 'B' low sulfur coals.

Remaining coal reserves in the Deer Creek are in both the Hiawatha and Blind Canyon seams. Where as; Coal reserves in the North Rilda and Mill Fork areas are supported by the development of the Rilda Canyon Portal Facilities located in the Hiawatha seam. Longwall mining of the North Rilda Ridge was completed during August 2004. Longwall mining of the Mill Fork reserves will continue from 2005 to approximately 2015. The Hiawatha and Blind Canyon seams are close together, usually within 80 vertical feet. The depths of both seams, therefore, are similar in those areas where both seams are present. Overburden depths (Volume 12 Mill Fork Lease R645-301-600 Geologic Section Maps MFS 1824D & MFS 1825D) range from 0 feet, where both seams outcrop at the surface, up to about 2,600 feet under the Flagstaff Limestone "caps" on East and Trail mountains. The overburden strata consist of those formations already listed in section R645-301-621:

- Flagstaff Limestone
- North Horn Formation
- Upper Price River Formation
- Castlegate Sandstone
- Blackhawk Formation

Localized rider coal seams are fairly common above both seams, occurring from 1 foot to 20 feet or more above the Hiawatha and Blind Canyon seams. None of these rider seams have been named or mined.

In this region of the Wasatch Plateau, the Hiawatha seam is the lowest coal seam present. In much of the mining area currently permitted by PacifiCorp, the Hiawatha seam rests directly on the Star Point Sandstone, a massive, medium-grained, brownish-gray sandstone, which makes a very good mine floor. In some areas, there are between 0 and 15 feet of interbedded softer mudstones and siltstones between the Hiawatha and the Star Point Sandstone.

Thickness of the coal seams is variable, ranging from as little as 0 feet up to 19 feet in the Blind Canyon and from 0 feet up to 19 feet in the Hiawatha. Coal thickness is dependent on two main factors – the amount of peat originally deposited in the Cretaceous swamps, which varies from region to region, and the amount of scouring or erosion of the peat that took place after the peat was deposited but before lithification of the sedimentary sequence. More coal was deposited in the center of the swamp areas than around the edges, where distributary stream channels either prevented deposition, or scoured away the peat already deposited.

At some point in time during peat swamp development, the environment of deposition changed and each successive peat swamp was overrun by sediments, mainly mudstones and sandstones. Stream beds that passed directly over the previously deposited peats eroded sinuous channels of various depths into the peat and left behind sand-filled "scours". This action cuts varying amounts of top coal from the original thickness. The sudden losses of coal height that occur under these localized scours have impacts on coal mining operations that range from mild to disastrous.

Regional variations in coal thickness in the Blind Canyon and Hiawatha seams have been documented to varying degrees by mining activities and exploration drilling funded by government agencies and industry. Regional thickness trends of these seams are fairly well known, but the localized thickness variations caused by channeling are not as well known due to the localized nature of channeling.

R645-301-621.300 All Coal Crop Lines of the Coal to Be Mined

Coal outcrop and projected outcrop lines are shown on Map 600-1(Drawing DS1882D). Coal outcrop lines are inferred where the outcrops are concealed by alluvium or colluvium.

Strike and dip of the coal seams are shown on Map MFU 1827D and MFU 1828D (Volume 12 Mill Fork Lease R645-301-600 Geologic Section). The strike of the coal seams varies as the coal beds and surrounding strata are folded by the different structures (Flat Canyon Anticline and Crandall Canyon Syncline) mentioned in the section on structures above. The dip of the coal beds in this area is usually gentle, with dips rarely exceeding 4 or 5 degrees.

R645-301-621.400 Location and Depth of Gas and Oil Wells

No oil & gas exploration activities have occurred within the North Rilda Area. A single gas well (Merit Energy Federal 32-23) is located adjacent to the mine workings in Section 23, T16S, R6E, SLB&M. A cooperative agreement between Merit Energy and PacifiCorp ensured that mine workings were confined in such a way that the well and associated pipeline were not impacted by mining or subsidence.

R645-301-623 Environmental Geologic Information

R645-301-623.100 Acid- and Toxic-Forming Strata

Extensive sampling and testing of overburden strata, coal, and surrounding rocks has shown that there are almost no materials present that are potentially acid- or toxic- forming media. Almost all samples show slight alkalinity. Yearly sampling of in-mine roof, coal, and floor materials continue to confirm these results. Detailed analyses are presented in Volume 12 Mill Fork Lease R645-301-600 Geologic Section Appendix C.

In addition, Energy West (now Interwest Mining Company) Mining Company drilled two (2) holes within 2nd Right development entries at cross cuts #6 and #10 (refer to Volume 11 Appendix Volume - Geology: Appendix B and Figure GF-3, Figure Tab). As discussed previously, two rock slopes have been developed through the upper member of the Star Point Sandstone (Spring Canyon Member) from the portal facility area to an interception point with the coal in 1st Right Submains. Excavated material from the slope (sandstone) is stored within the mine. These holes were drilled through the interval of the projected slope to document acid- and toxic-forming potential of the Upper Member (Spring Canyon) of the Star Point Sandstone. Each hole was sampled on approximately ten (10) foot intervals (refer to Soil Analysis Report in Volume 11 Appendix Volume- Geology: Appendix B). None of the samples were considered acid- and toxic-forming according to the specifications listed DOGM's "Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining".

R645-301-623.200 Reclamation Potential

With the acquisition of the Mill Fork State Lease 48258, underground operations at the Deer Creek Mine are expanding to the northeast. To improve overall transportation and economic considerations additional surface facilities are required in Rilda Canyon. This includes all support facilities for underground mining operations except coal transportation.

Surface facilities in Rilda Canyon includes the existing mine fan in the Left Fork of the canyon, and surface related facilities associated with the North Rilda Canyon Portal Facilities include; fuel dock, rock dust silo, fan, sediment pond, covered and open storage area, etc. The North Rilda Canyon Portal facilities are located approximately 20 feet below the Hiawatha Seam. To access the seam from this location, two rock slopes have been constructed through the Star Point Sandstone. Refer to Section R645-301-521 for a detailed description of all surface facilities constructed at the North Rilda Canyon access to the Mill Fork Lease. Also refer to Volume 12 of the Deer Creek MRP for detailed information of the mining plan, mining production, and mining methods that are utilized within the Mill Fork Lease.

Early mining operations occurred near the Rilda surface facilities (refer to Map 4-1). These operations include the Rominger (Ferrell) Mine, Jeppson Mine, Leroy (Comfort) Mine, and Helco Mine. Mining occurred in thesemine in the 1940's and early 1950's. Abandoned

Mine Lands (AML) reclaimed these mines in 1988. The sediment pond is located directly below the reclaimed Leroy Mine.

R645-301-623.300 Subsidence Control Plan

Surface subsidence of all of the Energy West (now Interwest Mining Company) permit and adjacent areas has been carefully surveyed, monitored and documented for almost 20 years. Subsidence has been monitored through 2017, three years after the last date of mining, by yearly comparison of new versus baseline aerial photography using sophisticated photogrammetric measuring techniques, and is tied to known surveyed control points on the ground. Overflights by helicopter of all mined areas have been conducted at least annually to inspect the ground surface. A Subsidence Monitoring Report have been published annually through 2017, and submitted to various regulatory agencies.

For the purposes of this section and the operations in the North Rilda Area, a subsidence control plan has been developed. Refer to R645-301-525 (Engineering) for plan details.

R645-301-624 Geologic Information

Numerous sedimentary rock formations are exposed in the North Rilda and Mill Fork areas on East Mountain both above and below the coal bearing Blackhawk formation. The composition, arrangement, and physical characteristics of these formations greatly affect the mining and hydrologic characteristics of the area.

The geologic formations exposed in the North Rilda Area range from Upper Cretaceous (100 million years old) to Tertiary and Recent in age (refer to Figure GF-1 and GF-2, Figure Tab). These formations, in ascending order from oldest to youngest, are the Masuk Shale member of the Mancos Shale, the Star Point Sandstone, the Blackhawk Formation, the Castlegate Sandstone, the Upper Price River Formation, and the lower part of the North Horn Formation (all Cretaceous), the upper part of the North Horn Formation, and Flagstaff Limestone (Tertiary). Recent geologic deposits include numerous stream terrace gravels along streams and rivers, glacial till deposits in the upper reaches of Cottonwood Canyon, and alluvial and colluvial fills in all of the significant drainages and in Joes Valley.

Vertical relief across the exposures of these formations is about 3,000 feet within the adjacent area. Overburden thickness above the lowest coal seam to be mined (the Hiawatha seam) ranges from about 200 feet up to about 2,600 feet.

This sedimentary sequence has been structurally modified only slightly over time. Three gentle fold structures, the Straight Canyon syncline, Flat Canyon anticline and the Crandall Canyon syncline, occur within the PacifiCorp mining leases. Dips of the beds are generally very gentle, less than 5 degrees. For detailed structure related to the North Rilda Area refer to Volume 12 Mill Fork Lease R645-301-600 Maps Geologic Formations, Blind Canyon Structure Contour and Hiawatha Structure Contour.

Faulting is present within the PacifiCorp mining leases. Three graben structures are present within and adjacent to the North Rilda Area, Roans Canyon, Left Fork and the Joes Valley (refer Volume 12 Mill Fork Lease R645-301-600 Maps Geologic Formations for the location of these structures in relationship to the North Rilda Area). A fourth graben-like structure, called the Mill Fork Fault, crosses the Mill Fork Access mains. In addition, numerous normal faults occur to the south and east of the North Rilda Area. No other faulting is known to exist within the North Rilda Area.

The Joes Valley Fault form the western boundary of the Mill Fork reserves. Displacement is over 1,500 feet, down thrown to the west, forming the Joes Valley graben.

Jointing of the sedimentary formations of the area is a significant and important feature. Jointing of the rocks surrounding the coal seams affects mine orientation and planning, as well as the hydrologic characteristics of the rocks. Joints in the area trend predominantly north – south to N 10° E (parallel to the Joes Valley Fault), with a few secondary sets at other orientations.

Surface and groundwater hydrology has been extensively studied within the permit area and adjacent areas. Surface water originates from melting snow, with a significant runoff season every year. Yearly precipitation has varied widely over the past 20 years, resulting in fluctuations of surface water flows and surface spring discharges.

Alluvial fills in the bottoms of Rilda and Mill Fork canyons have been shown to transport significant quantities of sub-surface water downstream. For a complete discussion of the surface hydrology of Rilda Canyon refer to R645-301-721: Existing Surface Water Resources.

Subsurface water, including water that is intercepted in mine workings, is usually encountered in ancient, perched aquifers. These perched aquifers are usually tabular or stream channel sandstones, which have moderate porosity, but low permeability. Water also is encountered perched in the open joint systems within these rocks. Subsurface water has also been encountered in some isolated incidents in fault zones and structural synclines, notably the Roans Canyon fault zone and Straight Canyon syncline, about mile south of the North Rilda Area.

Extensive research has shown that the surface and underground hydrologic systems are not hydraulically connected. No impact to surface hydrologic systems is anticipated within the permit and adjacent area. Some perched water will be encountered underground during mining activities within the adjacent area. The location and quantity of water encountered underground will depend on the types of rocks, joint patterns and geologic structures that are present.

R645-301-624.200 Overburden Removal

All mining related to the North Rilda and Mill Fork areas is from underground operations. Analyses of overburden materials are presented in Volume 12 R645-301-600 Appendix C and Volume 11 Appendix Volume - Geology: Appendix B.

As discussed earlier, Energy West (now Interwest Mining Company) Mining Company drilled two (2) holes within 2nd Right development entries at cross cuts #6 and #10 (refer to Volume 11 Appendix Volume - Geology: Appendix B and Figure GF-3, Figure Tab). Two rock slopes were developed through the upper member of the Star Point Sandstone (Spring Canyon Member) from the portal facility area to an interception point in 1st Right Submains. Excavated material from the slope (sandstone) was stored within the mine. These holes were drilled through the interval of the projected slope to document acid- and toxic-forming potential of the Upper Member (Spring Canyon) of the Star Point Sandstone. Each hole was sampled on approximately ten (10) foot intervals (refer to Soil Analysis Report in Volume 11 Appendix Volume - Geology: Appendix B). None of the samples were considered acid- and toxic-forming according to the specifications listed DOGM's "Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining".

Surface facilities in Rilda Canyon includes the existing mine fan in the Left Fork of the canyon, and surface related facilities associated with the North Rilda Canyon Portal Facilities including; fuel dock, rock dust silo, fan, sediment pond, covered and open storage area, etc. The North Rilda Canyon Portal surface facilities are located near the intersection of the Right and Left forks of Rilda Canyon. To access the seam from this location, two rock slopes were constructed through the Star Point Sandstone. Refer to Section R645-301-521 for a detailed description of all surface facilities constructed at the North Rilda Canyon access to the Mill Fork Lease and R645-301-200 Soils Section for a complete discussion related to the soil survey and analysis for all disturbances. Also refer to R645-301-500 Engineering Section for detailed information of the mining plan, mining production, and mining methods that is utilized within the North Rilda Area and Volume 12 of the Deer Creek MRP for the Mill Fork Lease.

R645-301-624.230 Chemical Analyses of the Coal Seam for Acid- and Toxic-Forming Materials

Chemical analyses for the Blind Canyon and Hiawatha coal seams within the ~~permit~~ adjacent area are available from drill cores from Energy West (now Interwest Mining Company) drill holes and run-of-mine coal sampling (refer to Volume 8 Geology and Volume 12 Mill Fork Lease R645-301-600 Appendix A).

R645-301-624.310 Drill Hole Logs

Volume 11 Appendix Volume - Geology: Appendix A contains a tabulation of all drill hole logs within the adjacent area. All drill hole logs are available for review at Energy West (now Interwest Mining Company) Mining's main office in Huntington, including the proprietary holes completed by PacifiCorp.

R645-301-624.320 Chemical Analyses for Acid- or Toxic- Forming Materials

Volume 12 Mill Fork Lease R645-301-600 Appendix C contains a table of analyses for acid- and toxic- forming or alkalinity-producing materials above and below the coal seams to be mined. Volume 11 Appendix Volume - Geology: Appendix B includes acid- and toxic- forming or alkalinity-producing materials related to the Upper Member of the Star Point Sandstone.

R645-301-624.330 Pyritic and Total Sulfur Chemical Analyses

Sulfur forms data for the Blind Canyon and Hiawatha coal seams within the East Mountain mining area are available from drill cores and run-of-mine coal samples. Total sulfur content averages approximately 0.5% and generally ranges from 0.48% to 0.59%. Of this sulfur content, 79% is in the form of organic sulfur and 16% is in the form of pyritic including marcasite; the remainder is in the form of sulfate (refer to Volume 8 Geology and Volume 12 Mill Fork Lease R645-301-624.230).

R645-301-627 Description of Overburden

Overburden above the lowest seam to be mined (the Hiawatha Seam) is shown Figure GF-1, GF-2 (Figure Tab), Map MFU 1829D, Geologic Cross-Sections (Volume 12 Mill Fork Lease) and Volume 8. The overburden above the coal seams to be mined includes the Blackhawk Formation, the Castlegate Sandstone, the Upper Price River Formation, the North Horn Formation and Flagstaff Limestone.

The Blackhawk Formation consists of interbedded fluvial mudstones, siltstones, sandstones and coals. The vertical makeup of this formation is highly variable. Generally, the Blackhawk is sandier toward the top, and shalier toward the bottom. The mineable coal seams are usually within the bottom 300 feet of the formation, along with numerous rider seams and carbonaceous mudstones. This formation usually forms a long, steep slope (about 40 degrees) with frequent outcrops of large channel sandstones. The Blackhawk Formation ranges from 600 to 800 feet thick in the permit and adjacent areas.

The Castlegate Sandstone, which comprises the lower half of the Price River Formation, is a prominent cliff-forming sandstone, which forms cliffs or steep blocky outcrops that are visible nearly everywhere in the permit and adjacent areas. The Castlegate is a massive, coarse grained, occasionally conglomeratic or arkosic sandstone. The prominent North – South joint set is usually clearly visible in outcrops of the Castlegate. The Castlegate Sandstone averages about 300 feet thick in the permit and adjacent areas.

The Upper Price River Formation consists of interbedded coarse-grained sandstones that resemble those of the Castlegate Sandstone, but are softer, and interbedded with occasional mudstones. The Upper Price River Formation forms a steep slope above the Castlegate Sandstone cliffs. The thickness of the Upper Price River formation is difficult to determine,

due to its gradational contact with the overlying North Horn Formation, but is probably about 600 feet thick in the permit and adjacent areas.

The contact between the Upper Price River Formation and the North Horn Formation is difficult to discern on East Mountain, but is generally picked as the change in slope from the steeper outcrops of the Upper Price River Formation below to the gentler and more rolling slopes of the North Horn Formation above.

The North Horn Formation is a softer formation which forms the rolling, slumping, hummocky terrain near the top of East Mountain. The North Horn consists mostly of interbedded shales and clays, with occasional sandstone and fresh water limestone beds. The North Horn Formation has a characteristic orange to reddish purple color. Outcrops of the North Horn formation are rare, and usually seen on very steep eroded slopes or in landslide areas. The North Horn Formation is about 800 – 1,000 feet thick in the permit and adjacent areas.

The Flagstaff Limestone forms isolated "caps" on the highest peaks of East Mountain to the west of the North Rilda Area. The Flagstaff Limestone is a fresh water lacustrine limestone which is about 100 to 200 feet thick. This limestone is hard and resistant.

In terms of potential subsidence, this combination of hard and soft formations has a beneficial effect. The Castlegate Sandstone is generally considered a barrier to subsidence. It is so thick and massive that in some places such as Trail Mountain, the Castlegate essentially prevents subsidence cracking from reaching the surface. Only minor surface cracks have been detected on Trail Mountain. The softer formations above the Castlegate have a tendency to move and settle without major cracking due to their softer nature.

Most of the surface cracking in the Deer Creek mine area has occurred in shallow cover areas of Blackhawk Formation exposures, or along the edges of groups of longwall panels.

Because the Castlegate Sandstone is a prominent cliff-former, subsidence damage to the formations overlying the mines is concentrated in the Castlegate. This damage takes place when undermining cause's vertical and overhanging cliff faces and balanced rocks to fail. Cliff failures of this type have been isolated to Newberry Canyon and Corncob Wash above the Cottonwood mine, and a section of cliff above the Trail Mountain Mine, and represent a fraction of the total amount of Castlegate Sandstone cliffs undermined. Rock falls above the Deer Creek Mine on the south side of Rilda Canyon have also been documented. Energy conducted an extensive study of the effects of subsidence on the Castlegate sandstone cliffs on the north side of Rilda Canyon. The results of this study will determine the effectiveness of the empirical model developed and used to predict the likelihood of cliff failure.

R645-301-630 OPERATION PLAN

The adjacent area contains areas of mineable coal in both the Blind Canyon and Hiawatha seams.

Mine Plan: Access to the North Rilda reserves was achieved with the use of 5-entry set of mains referred to as 4th North Mains. The 4th North Mains are developed northwest (approximately 4000 feet) from the 4th North / 10th West Mains intersection. Mainline development, designated as 5th North, then changed course to a northeast bearing, with development proceeding under the Right Fork area of Rilda Canyon. Selection of the Right Fork stream crossing area was based on the results of an extensive surface exploration program conducted in the Right Fork of Rilda Canyon (refer to Volume 9 Hydrology Maps HM-9, HM-10 and HM-12). A series of six drill holes were completed in 1997 to document coal seam characteristics, structural geology and hydrologic conditions. Drilling was conducted on approximately 250 foot centers across the projected Mill Fork Graben from previously completed drill holes EM-158 and EM-56. No structural discontinuities were identified during drilling. Groundwater encountered during drilling was restricted to minor quantities from the alluvium/colluvial fill (estimated at 2 - 5 GPM) near the bedrock interface. Based upon the results of the surface exploration program, mining below the Right Fork of Rilda Canyon was re-located approximately 800 feet to the west of the original projection. Re-location of the mains to the west increased the overburden from approximately 120 to 200 feet.

Based on the information gained from the surface exploration program, a detailed plan was developed to position the 4th North/5th North intersection to optimize the "no-subsidence" design of the 5th North / Rilda Canyon Right Fork crossing route and rock slope access into the lower Hiawatha Seam as well as maximizing overall reserve recovery within the area.

From the 4th North/5th North intersection, mainline development will proceed to the northern boundary of Federal Coal Lease U-024317. Longwall gateroad development sections were driven due east from the 5th North Mains to the extent of mineable reserves. Six longwall panels were completed in the Blind Canyon Seam, and six longwall panels were completed in the Hiawatha Seam.

Hiawatha Seam Access: Access to the to North Rilda Hiawatha seam reserves was achieved with development of rock slopes and vertical shafts from the Blind Canyon seam to the lower seam. From the bottom of the slopes, a 5-entry set of mains referred to as 6th North Mains were developed to the northeast for access to gateroad development in the Hiawatha seam. Main line development was reduced to three entries above 6th Right.

Mill Fork State Lease ML-48258 Access: Based on data acquired through surface coal exploration programs, Energy West (now Interwest Mining Company) developed a mine plan to access the Mill Fork State Lease with a set of 5-entry mains driven on a northwest bearing from the 6th North Mains. Mining within the Mill Fork Access corridor will be restricted to mainline development. To ensure long term stability, pillars will not be removed (refer to Volume 11 Appendix Volume - Engineering: Appendix 1 Map DU1688).

North Rilda Canyon Portal Facility Access: Based on data acquired through in-mine directional drilling program, Energy West (now Interwest Mining Company) developed a mine plan to access the North Rilda Canyon Portal Facility area with the continuation of a set of three entry submains referred to as 1st Right submains. Two rock slopes; intake and return, were developed through the upper member of the Star Point Sandstone (Spring Canyon Member) from the portal facility area to an interception point in 1st Right Submains. The slopes were constructed at the elevation of the mine facilities pad and sloped upward ranging from 3% to 8% for approximately 740 feet to the Hiawatha coal seam. The dimensions of the portals are a 20' x 9' foot rectangular opening.

R645-301-631 Casing and Sealing of Boreholes

Each coal exploration permit application will include a description of the methods used to backfill, plug, case, cap, seal or otherwise manage exploration holes or boreholes to prevent acid or toxic drainage from entering water resources, minimize disturbance to the livestock, fish and wildlife, and machinery in the permit and adjacent area. Each exploration hole or borehole that is uncovered or exposed by coal mining and reclamation operations within the permit and adjacent areas will be permanently closed, unless approved for water monitoring or otherwise managed in a manner approved by the Division. Use of an exploration borehole as a water monitoring or water well must meet the provisions of R645-301-731. The requirements of R645-301-731.400 do not apply to boreholes drilled for the purposes of blasting.

Exploration boreholes are plugged after use by filling the hole with type II portland cement from total depth through the coal zones, then the remainder of the hole is filled with "abantonite," a bentonite gel specifically made to seal drillholes. If circulation cannot be maintained within the borehole, enough cement and abantonite to fill the borehole completely plus 10% is pumped to the bottom of the hole, then the remainder of the hole is filled with bentonite chips or pellets to within the top 5' of the hole, and a cement surface plug containing a permanent hole identification marker is placed in the top of the hole. This hole plugging method is approved by the BLM and DOGM, and is used on all present and future exploration boreholes. If an exploration borehole is to be converted to a water monitoring well, the water well regulations of the State of Utah are used to construct the well completion.

R645-301-632 Subsidence Monitoring

All mining within the permit and adjacent areas will be underneath the uninhabited North Rilda Area of East Mountain. No dwellings or building structures or roads will be undermined.

One power transmission line is present within the North Rilda area. This transmission line is owned and operated by Utah Power, a subsidiary of PacifiCorp. The transmission line (25 KV) was constructed parallel to the Emery County Road #306 and transmits electricity from the Huntington Canyon mainline to the Left Fork facilities.

The method used to detect and document subsidence on East Mountain divides the land surface into separate study areas based on the second-mining areas in the mine plan. These areas have been then studied through 2017 using photogrammetric comparisons of each successive year of mining progress.

R645-301-641 Sealing of Boreholes

All exploration boreholes are sealed upon completion using the following method. The borehole is filled with cement/abantonite from bottom to top through the drill pipe or other pipe lowered into the hole. As much cement/abantonite is used to fill the hole, or if the hole does not fill, enough cement/abantonite to fill the hole plus 10% is pumped through the pipe into the hole. If the hole does not fill to the surface, the remainder of the hole is filled with bentonite chips to within 5' of the surface. A cement surface plug is placed in the hole, and a brass marker with the hole number and year is placed on top of the cement, two feet below surface grade (refer to Volume 11 Appendix Volume Geology: Appendix A for exploration drillhole Table 1, Existing Exploration Drillhole Completion Details).

Regulatory oversight authority for the various phases of exploration drilling and data analysis is delegated as follows:

a.	Determine if mineable coal reserves are present	BLM
b.	NEPA analysis	BLM/Surface Management Agency (SMA), DOGM comment on reclamation
c.	Exploration license or drill permit	BLM with SMA concurrence approval
d.	Inspections	BLM, SMA, DOGM (shared resources)
e.	Enforcement	BLM, SMA, DOGM with SMA cooperation
f.	Appeals	BLM, SMA, and/or DOGM

Additionally, over 500 holes have been drilled from within the mines of the area; all provide information about the geology of the area. Finally, coal seams exposed by outcrops and within the mine workings have been mapped in detail, providing data and knowledge of the geology in the area.

REFERENCES

Doelling, H.H., 1972, Wasatch Plateau Coal Fields, *in* Doelling, H.H. (ed.), Central Utah Coal Fields; Sevier-Sanpete, Wasatch Plateau, Book Cliffs and Emery, Utah Geological and Mineralogical Survey Monograph Series No. 3, Salt Lake City, Utah.

Amendment to Deer Creek and Cottonwood/Wilberg Mining Permits – PacifiCorp, 12/5/2018

Cottonwood/Wilberg Mine permit Volume 7-Appendix XVI

Deer Creek Mine Permit Volume 3B-Appendix X

Addendum to the Subsidence Control Plan entitled:

"UTAH POWER AND LIGHT COMPANY"
"DEER CREEK AND COTTONWOOD/WILBERG MINES"

"Subsidence Monitoring Plan"

"Revised 1/20/89"

Pages 4 and 5 of this document committed the permittee to indefinite yearly subsidence surveys and reports.

Mining operations of Utah Power and Light Company (now Interwest Mining Company), a subsidiary of PacifiCorp, ceased all mining activities in January, 2015. Yearly subsidence surveys and reports continued for 3 years after the date of final mining, through 2017, as required by the Memorandum of Understanding originated by UDOGM, BLM, and the U.S. Forest Service in 1996. The 2017 report showed and stated that the subsidence in all mining areas was stable and complete. The BLM and UDOGM concur that the subsidence above the PacifiCorp mines is stable and complete. Yearly subsidence surveys and reports have ended with the report of 2017.

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